

# COAL MINING

FEBRUARY, 1953

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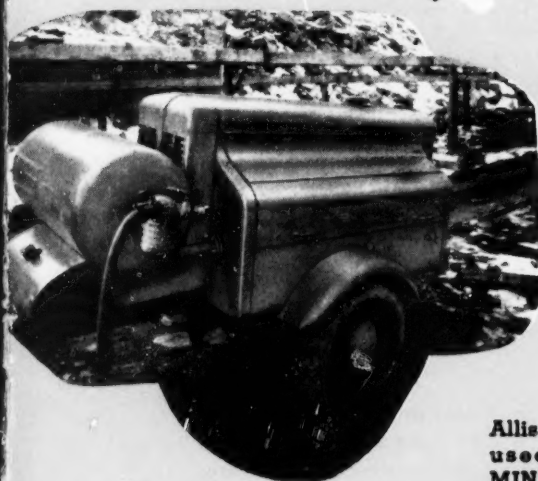
*...they go together*

**the best in mining  
equipment and  
Highway service!**

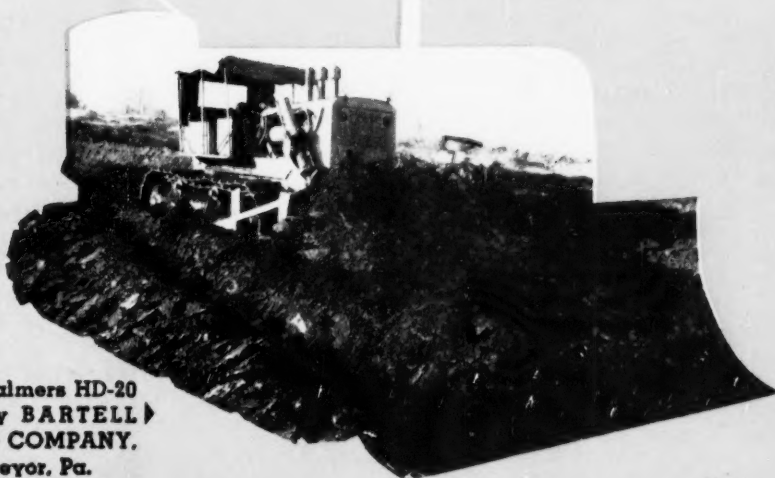


Jaeger 125 ... LINGLE  
COAL CO., Shawville

Lima 1201 is in daily  
use at SHAWVILLE  
COAL CO., Shawville



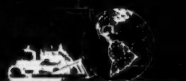
Allis-Chalmers HD-20  
used by BARTELL  
MINING COMPANY,  
Surveyor, Pa.



A-6962

*Highway*

**EQUIPMENT  
COMPANY**

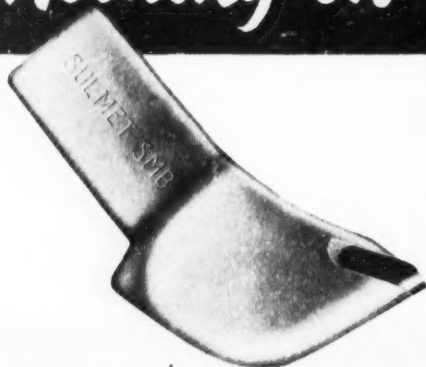


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• ERIE BINS



*Nothing on the Market Matches*



# JOY SULMET CUTTER BITS

## AGAIN SULMET BITS PROVE SUPERIOR

**THE PROBLEM:** A Western Pennsylvania mine has sulphur streaks, 1" to 6" thick, running throughout the seam. Hard clay veins occasionally obliterate the coal for two or three cuts. Both an undercut and shear cut were used, and shearing through these impurities caused so much wear that cutting time per shift was greatly reduced by frequent bit changing.

**THE SOLUTION:** A test run was made on their Universal machine with 125 Sulmet SMB Bits (see above). After four weeks of operation, three shifts a day, the test was considered complete, although 89 bits still had a life expectancy of two or three weeks. Even if all were considered worn out, bit cost would be only \$.026 per ton of coal. Also, cutting speed had increased tremendously since all bit-changing could be handled between shifts.

## WHEN IT COMES TO CONQUERING TOUGH SEAM CONDITIONS

JOY Sulmet Tungsten Carbide Cutter Bits can cut faster and at less cost per ton of coal than any other bit on the market—*facts proved by actual operating records from many different mining areas and under widely varying seam conditions.* An exclusive Joy feature—the use of a protective cap over the tungsten carbide insert—reduces bit breakage and practically ends insert loss. Sulmet Bits are available in eight cutter styles, including a design for the Bowditch ML Chain, plus auger and finger bits for Coal Drills.

● *Let us show you what they can do for you.*

**See the Joy Film: "Sulmet Tungsten Carbide Bits" 16 mm • Sound • Full Color • 40 Minutes**  
**Write our Film Booking Office for free showing**

*Consult a Joy Engineer*



# JOY MANUFACTURING COMPANY

**GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.**

**IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO**

# CUT DRILLING COSTS !!!

## BLAST HOLE AND COAL RECOVERY DRILLS



• McCarthy Self-Propelled Horizontal Blast Hole Drills get in and out of tight quarters quickly; adjust on four individual leveling jacks for proper drilling heights. Excellent for low level work.



• Truck Mounted Horizontal McCarthy Drills are breaking drilling records everywhere! All necessary equipment is carried with the unit—out of the mud at working level!



• Here's a Vertical McCarthy Unit on a Half-Track. Compact construction makes McCarthy Drills perfect for all mountings... truck, half-track, cat, jumbo or other special rigs.

### HYDRAULIC FEED



Instant-action control selects any speed up to 60 feet per minute

### FINGER-TIP CONTROL



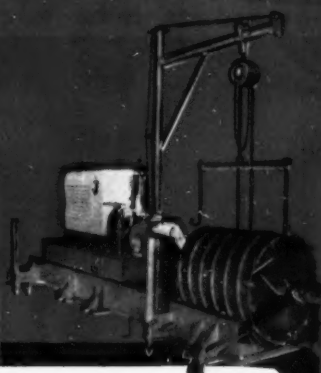
Determines rotating speed of auger.

**Heavy**  
**Rugged**  
**Powerful**



• Compact mobile-unit for vertical blast hole drilling. Retractable tower hydraulically operated. Setups are easy, drilling action positive, cuts drilling cost per foot.

• McCarthy Coal Recovery Drills are revolutionizing both deep and strip mine operations. As the auger moves in, steady streams of clean coal are pulled out without touching the overburden. Average daily output ranges from 15 to 30 tons per man per shift. Many models are available. The machine illustrated above is equipped with a 36-inch auger, retriever, hoist and Lump Drill Head.



## MCCARTHY DRILLS

• If you haven't already seen a McCarthy at work, we suggest you see one quick!

These rugged, powerful units have gained universal acceptance as the most efficient machines ever made for drilling blast holes. Furnished with gasoline, electric or diesel power.

Extra heavy construction relieves you of maintenance troubles. They're versatile, fast, economical machines capable of 50% more productive service than any drill you might now be using!

Write Salem Tool today for full facts. Also ask about McCarthy Coal Recovery Drills—the machine that's being acclaimed in so many trade journals for its remarkable ability to reduce mining costs.

DRILLING EQUIPMENT SINCE 1901



# THE SALEM TOOL CO.

763 S. ELLSWORTH AVE.

SALEM, OHIO, U. S. A.

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# NOW'S THE SEASON



# TO GET

## ... with

**Get Your Present Equipment Ready.** Let our skilled mechanics give your machines a "Cat" Care treatment. These inspections take care of minor adjustments . . . find wear before it causes trouble . . . assure you of a trouble-free work season. If your equipment needs major overhauling, schedule it now so it'll be ready by Spring.



**Get Ready For Long Hauls —** with "Cat" DW20's or 21's. These new high-speed earthmovers make any haul a profit haul at speeds up to 26.6 mph. Here's one of Ruth Construction Co.'s DW20-W20 Wagon teams hauling 25-heaped pay-yards! Some models are available right now!



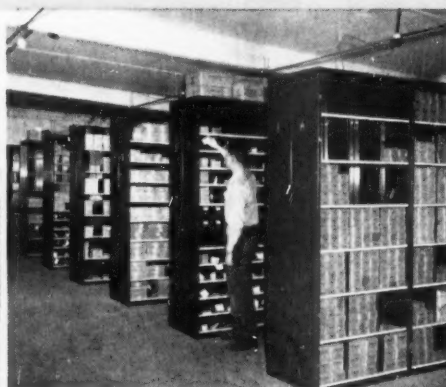
**Get Ready For More Profit** on the Shorter Hauls. Easy-loading "Cat" Scrapers make every load a pay-load . . . and they make a profit with any tractor, regardless of make. Bowser & Echnoz, Kittanning, Pa., is using a No. 80 to move sand along the Allegheny River. We have a scraper for your tractor!



**Get Ready For Production!** Three different sizes of "Cat" Motor Graders have a balance between power, speed, traction and weight to turn out a lot of work — grading, maintaining roads, snow removal and other jobs like cleaning the coal seam. That's what this 50 HP No. 212 Motor Grader is doing for Dunlop Coal of Windber, Pa.



**We're Ready To Help You!** Our convenient facilities are ready to serve your equipment and service needs. Give us a call and let us know where you'll be working. We'll stop around once in a while to check your jobs and equipment.



**Parts Are Ready!** Our bins are full and many more genuine factory-made parts are coming in each day. Some are still in short supply, but our rebuilding facilities are ready to keep you at work. If you'll need parts later on in the season, order them now for better delivery.

Whatever your equipment needs, we're geared to help you. Call on us, anytime, for equipment aids, engineering assistance or service.

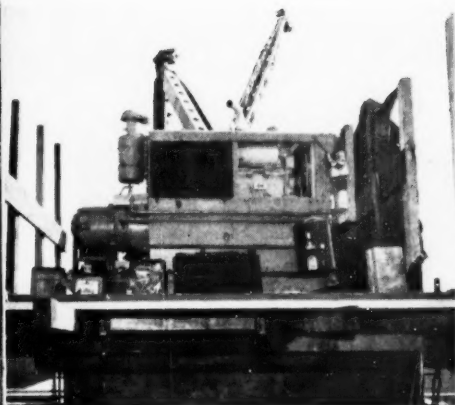


# READY FOR SPRING

## BECKWITH Machinery Co. Services!

Be ready to go to full capacity work the minute Spring gives the green light! Have your equipment fleets rounded out . . . have your jobs planned to make full use of the money-making ability of "Caterpillar" units . . . have your machines in top-notch shape for a full season of work!

We're ready to help you get ready for Spring. Our "Caterpillar" equipment engineers are at your service to aid you in selecting the right machines for your work . . . our parts men had Spring fever early to be alert for your orders now . . . our service technicians have their tools in shape, the shops clean, ready for prompt attention to your needs. Just give us a ring!



**Get Ready With New Power.** Boost production . . . lower operating costs . . . work free of downtime — by repowering with "Cat" Diesels. Many models in the "Cat" line (ranging to 500 HP) can be installed immediately. Here a D318 powers a hoist of the American Bridge Co. on the Tarentum Bridge job.



**Get Ready To Dig** — fast, steady and at a profit with a "Cat"-powered Bucyrus-Erie Shovel, Crane or Dragline. A D13000 powers this Bucyrus-Erie 38-B Dragline working at the sand and gravel plant of the Weirton Construction Co., Weirton, W. Va.



**Get Ready For Prompt Service On The Job!** Make sure there's a complete list of phone numbers of Beckwith's Service Departments at each of your jobs. Then you're assured of the fast service that gets your machines back to work "right now!"

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## How Allis-Chalmers MOTOR SCRAPERS Help **Cut Cost per Yard**



**Positive, forced ejection** . . . eliminates wasteful circling or other time-consuming methods of removing the load. Allis-Chalmers' patented forced-ejection system plus high apron lift *bulldozes* dirt out of the bowl fast every trip . . . without extra wear and tear on power control unit cables and clutches.



**Easy operation.** From foam rubber seat to finger-tip control, shock-free hydraulic steering and full visibility, a TS-300 operator has every available help for safe, sure, speedy work. Balanced weight distribution and low center of gravity make A-C MOTOR SCRAPERS easy to maneuver even at top speed.



**Faster, easier loading** . . . because A-C MOTOR SCRAPERS have up to 20 hp. to handle every struck yard . . . plus offset cutting edges and "center-boiling" loading action that spills the dirt evenly, filling corner voids for full capacity loads.

**High-speed hauling.** The power behind the TS-300 teams up with big, traction-type tires that gear it to the road . . . move capacity loads at 22.5 mph. And operating clearance of 20 in. helps keep it from hanging up on rutted haul roads.

## by Cutting Time per Yard



**A dirt-moving "package"** that makes every second count. The powerful HD-20 torque converter tractor is an ideal teammate for the TS-300. It synchronizes to scraper speed at contact . . . automatically loads at fastest speed conditions permit with less strain on operator and equipment . . . gives scraper an extra fast start to the fill.

Your nearby A-C dealer will be glad to give you more yardage-boosting facts about job-tested, *job-proved* MOTOR SCRAPERS. He can also tell you where you can see them at work and talk to the men who own and operate them. You owe it to yourself to call or stop in soon.

### TS-300 MOTOR SCRAPER

14 cu. yd. struck capacity  
18 cu. yd. heaped capacity  
280 hp. Buda diesel or  
275 hp. Cummins diesel

### TS-200 MOTOR SCRAPER

10 cu. yd. struck capacity  
13 cu. yd. heaped capacity  
176 hp. Buda diesel or  
165 hp. Cummins diesel

**ALLIS-CHALMERS**  
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

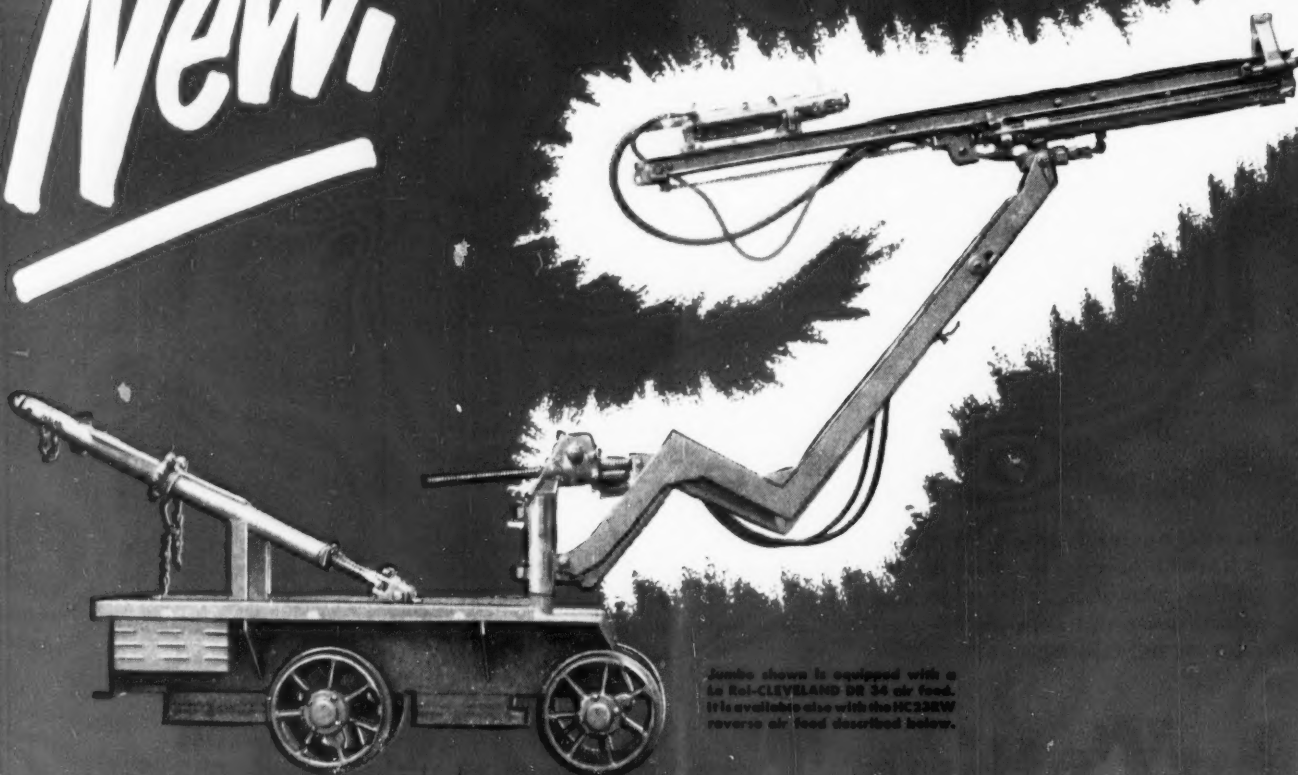


THE FINEST LINE ON EARTH

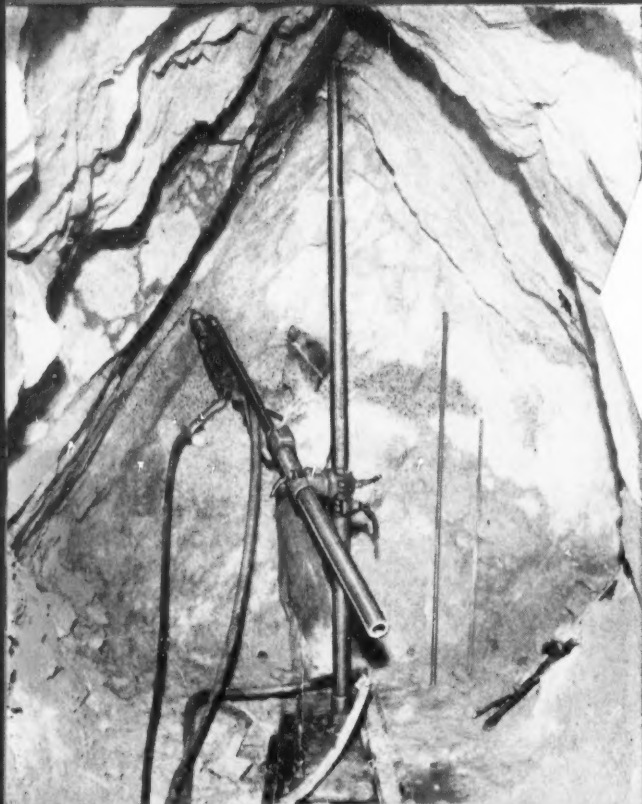


# New!

# Speeds up



Machine shown is equipped with a Le Roi-CLEVELAND DR 34 air feed. It is available also with the HC23RW reverse air feed described below.



## Miners like Le Roi-CLEVELAND HC23RW Reverse Air Feed Drifters

### Management does, too

**Faster Steel Changes!** No swing or dump nuts to loosen and reset. Your miners simply swing drifter on feed cylinder and change steels. It's not only easy — it lets them drill out the round faster.

**No Stuck Steels!** Positive air feed keeps drills working at peak efficiency, avoids stuck steels.

**Higher Drilling Speeds!** Positive air feed plus proper force of blow and strong rotation give faster drilling speeds with both steel and tungsten carbide bits. You get longer bit life, too, and drill more footage.

**Low Upkeep Cost!** No feed screws or feed-screw nuts to wear. No complicated power-feed mechanism to give trouble.

**Easy to Operate!** Built to lighten the load on your miners. Feed controls conveniently located. Reverse air feed withdraws steel from hole quickly.

**Faster Set-ups!** The combination of Le Roi-CLEVELAND Air Feed Drifters and air columns gives you a unit that can be set up easily and quickly. And you can get the air column in any height you want.

# drilling cycles

## Le Roi-CLEVELAND *self-leveling* Mine Jumbo with four-foot steel-change Air Feed Drifter

**Saves time drilling lifters!  
Lets your miners drill the right  
round for any ground!**

You couldn't ask for more from a mine jumbo than the performance you get from this new Le Roi-CLEVELAND. It's got plenty of stuff. And the payoff for you is faster cycles, greater tonnage per man-shift, lower costs! Here's why:

**Self-leveling, air-motor-powered arm,** lets miners spot and space holes quickly and easily, for the most efficient fragmentation. They don't have to loosen a bolt or tilt a boom, to complete the drilling cycle.

**Exclusive rigid screw and gearing mechanism** keeps the heading straight, cuts down overbreak and underbreak. Keeps the drifters in line, prevents the steel from binding, reduces chuck wear.

**Offset arm** provides plenty of clearance to drill lifters — without having to take time out to swing the drill under the arm.

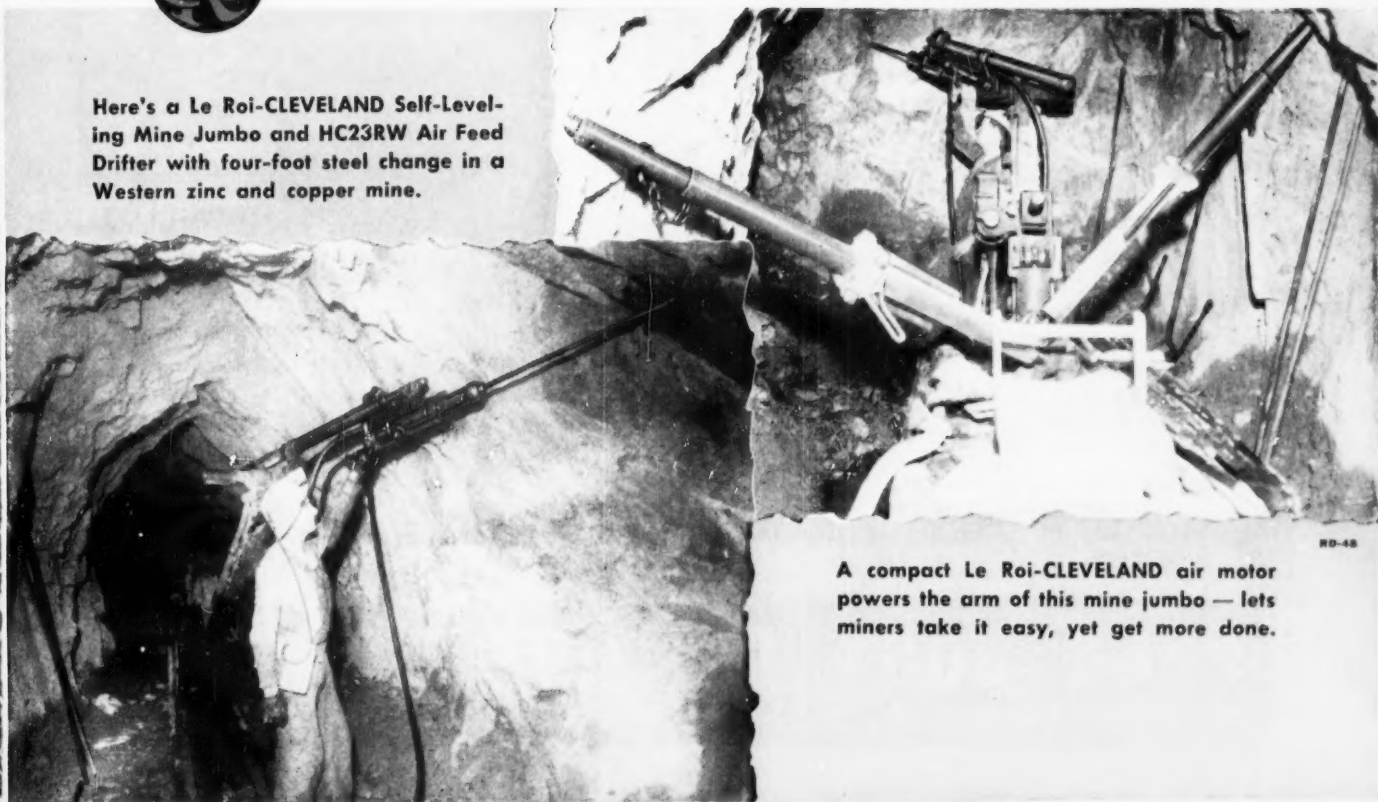
You can get this Le Roi-CLEVELAND Self-Leveling Mine Jumbo in either single-arm or double-arm construction. Write for further information and see for yourself how either model can help you get more done every shift.



## LE ROI COMPANY

CLEVELAND ROCK DRILL DIVISION  
12500 Berea Road, Cleveland 11, Ohio  
Plants: Milwaukee, Cleveland and Greenwich, O.

Here's a Le Roi-CLEVELAND Self-Leveling Mine Jumbo and HC23RW Air Feed Drifter with four-foot steel change in a Western zinc and copper mine.



A compact Le Roi-CLEVELAND air motor powers the arm of this mine jumbo — lets miners take it easy, yet get more done.

RD-48

# PENN

**TELESCOPIC HOISTS**  
*...do it the easy way*  
**up to 50 ton capacity**



- 1—Rugged Construction.
- 2—Fan and Gusset type hinge. 16" bearing surface . . . 3" rear shaft.
- 3—Polished and ground sleeves.
- 4—Heavy duty 2½" roller bearing pump and hoist meter.

**H**ERE is a telescopic hoist that was designed as a rough and ready companion for Penn Steel Dump Bodies. Requiring a minimum of maintenance and built to give long trouble-free service, Penn Telescopic Hoists lift heavy loads with ease without the risk of bending or twisting. No cams, levers, arms or rollers are used—lifting power is applied directly to the load. **BE SURE OF THE BEST—Specify PENN!**

## PENN BODY DIVISION

## HOCKENSMITH CORPORATION

Telephones: Jeannette, Pa. 700 . . . Pittsburgh, Electric 1-1242

PENN, PA.



# COAL MINING

Vol. XXX February, 1953 No. 2

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Serving the Mining Industry Since 1901

## TO HELP SELL COAL...

**BCI Advertises to the Industrial, Commercial and Institutional Markets.**

Each month, full-page messages like the one shown below—featuring either “off-track” or “on-track” installations—appear

in the pages of *Business Week*, *Nation's Business* and a carefully selected group of power journals and trade magazines.

### For **LOW-COST DEPENDABLE** steam, **UPJOHN** burns **COAL** the modern way!



The firing aisle of Upjohn's ultramodern steam plant. This plant supplies steam, cleanly and efficiently, at only 40¢ to 42¢ per 1,000 lbs. for the Portage Road Plant near Kalamazoo, Michigan. There are

Upjohn's new pharmaceutical plant which includes units for production of penicillin and cortisone, as well as some 700 other pharmaceutical products, relies on coal for dependable steam!

no dust or smoke nuisances, thanks to the dust-collecting and cinder re-injection system. Ash handling is fully automatic. These 3 boilers, plus a fourth recently installed (not illustrated), deliver up to 115,000 lbs. steam per hour at peak load.

Whether you're building a new plant or modernizing an older one, you can count on coal for dependability and low-cost operation.

Here's why: Up-to-date coal-burning equipment can give you 10% to 40% more steam per dollar. Automatic coal- and ash-handling systems can cut your labor cost to a minimum. Let a consulting engineer show you how a modern coal installation, tailored for your specific needs, can save you real money.

Here's something else, too—of all fuels, coal alone has virtually inexhaustible resources. This, plus the fact that America's highly mechanized coal industry is the most efficient in the world, assures you of a dependable supply of coal at relatively stable prices now and for years to come.

**If you operate a steam plant, you can't afford to ignore these facts!**

- COAL** in most places is today's lowest-cost fuel.
- COAL** resources in America are adequate for all needs—for hundreds of years to come.
- COAL** production in the U.S.A. is highly mechanized and by far the most efficient in the world.
- COAL** prices will therefore remain the most stable of all fuels.
- COAL** is the safest fuel to store and use.
- COAL** is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

**BITUMINOUS COAL INSTITUTE**  
A Department of National Coal Association,  
Washington, D. C.

FOR HIGH EFFICIENCY  FOR LOW COST  
**YOU CAN COUNT ON COAL!**

## Do You Know?

● More than one out of four workers in American industry are bored by the repetitive jobs they have to do. But psychologists are upping production and making employees happier by the simple expedient of passing around the various kinds of tasks.

New ways of fitting the industrial machine to human beings were reported by Dr. Morris S. Viteles, psychology professor of the University of Pennsylvania, at sessions of the American Association for the Advancement of Science.

First of all, Dr. Viteles advised that less intelligent people be picked for monotonous jobs, because they are less susceptible to boredom. Personnel managers and industrial executives already have caught onto this. Many people are finding machine-like, speed-regulated work challenging.

But the main method of making factories happier is to use the trick of what Dr. Viteles calls "changing the work situation." This means that a girl is changed, during the day, from making cigarettes to cutting them, or a clerk is shifted from one kind of routine work to another so that the job varies.

Rest pauses help alleviate boredom, and the tempo of the work can be adjusted to the need of individuals without loss of efficiency.

The dangers of monotony did not arise with the modern industrial age, Dr. Viteles said, because throughout the ages a large proportion of the work of the world has been repetitive.

Today, despite the intensification of repetitive work by machine, the situation may be better than in the past because of the shorter working day, higher standards of living, and better recreation and educational facilities.

Playing music as a background in the factory does not significantly decrease or increase output, late studies show. But most employees like it. Dr. Viteles suggests that it is an antidote to the unpleasant feeling created by monotonous work.

● Machines must be designed to fit their operator's capabilities and limitations or else some of the gadgetry that has been included to get better results may go to waste.

Machines are not replacing men but are merely changing the nature of their work, Dr. Jack W. Dunlap, president of Dunlap and Associates, Inc., Stamford, Conn., reported to the American Association for the Advancement of Science today.

Machines relieve workmen of some muscular effort, routine work, rapid computations and some fine discriminations, but require more dial-watching, panel-monitoring and machine maintenance. Failure to consider the human element can result in serious curtailment of machine performance, he said.

One undisclosed firm requested plans for a new control room in which operator comfort, ease of operation, accuracy and efficiency of operation were to be considered. Subsequent statistics show the control room is recovering its complete design and construction costs every 60 days with increased production.

## Here and There in the Coal Industry

● The National Council of Coal Lessors, holding its annual membership meeting at the Washington Hotel, in Washington, D. C., elected the following Directors for the coming year:

S. T. Brown, Roanoke, Va.; Rolla D. Campbell, Huntington, W. Va.; Roger F. Cooper, Lexington, Ky.; Robert M. Fisher, Indiana, Pa.; J. M. B. Lewis, Jr., Bluefield, W. Va.; and J. G. Paterbaugh, McAlester, Okla.

Current officers of the organization are Mr. Cooper, President; Mr. Campbell, Vice President; Mr. Lewis, Secretary; and Mr. Brown, Treasurer.



H. B. McClure, Vice Pres., Carbide & Carbon Chemicals Co., at the NCA convention, New York, November, 1952.

● Assignment of new responsibilities to five members of field management in the Eastern Gas and Fuel Associates mining organization were announced today by H. John Harper, general manager of Eastern's mines. All are effective Feb. 1.

A. P. Boxley, Beckley, manager, High Volatile division, will be transferred to Mr. Harper's organization in the Pittsburgh offices where he will become production manager for all mines.

W. D. Hawley, Glen White, general superintendent, Low Volatile division, will replace Mr. Boxley as division manager in the High Volatile division. His offices will remain at Glen White.

The position of general superintendent will be eliminated from the organization and officials now acting in that capacity will be trans-

ferred to other duties as will be Mr. Hawley.

E. H. Shaw, Kimball, general superintendent, McDowell county mines, and J. S. Wells, general superintendent, Boone and Wyoming county mines in West Virginia and the Weeksbury mine in Kentucky, will become production engineers in the offices of division managers. Mr. Shaw will be associated with H. A. Quenon, manager Low Volatile division, and Mr. Wells with Mr. Hawley in the High Volatile division.

W. W. Hunter, general superintendent, Fayette county mines, will be assigned to special duties under Mr. Boxley.

Mr. Quenon's office will remain in Beckley.

● The Jewell Ridge Coal Corporation, Tazewell, Va., announces the purchase of the Hutchinson Coal Company of Fairmont, W. Va., which operates three mines in the Logan field.

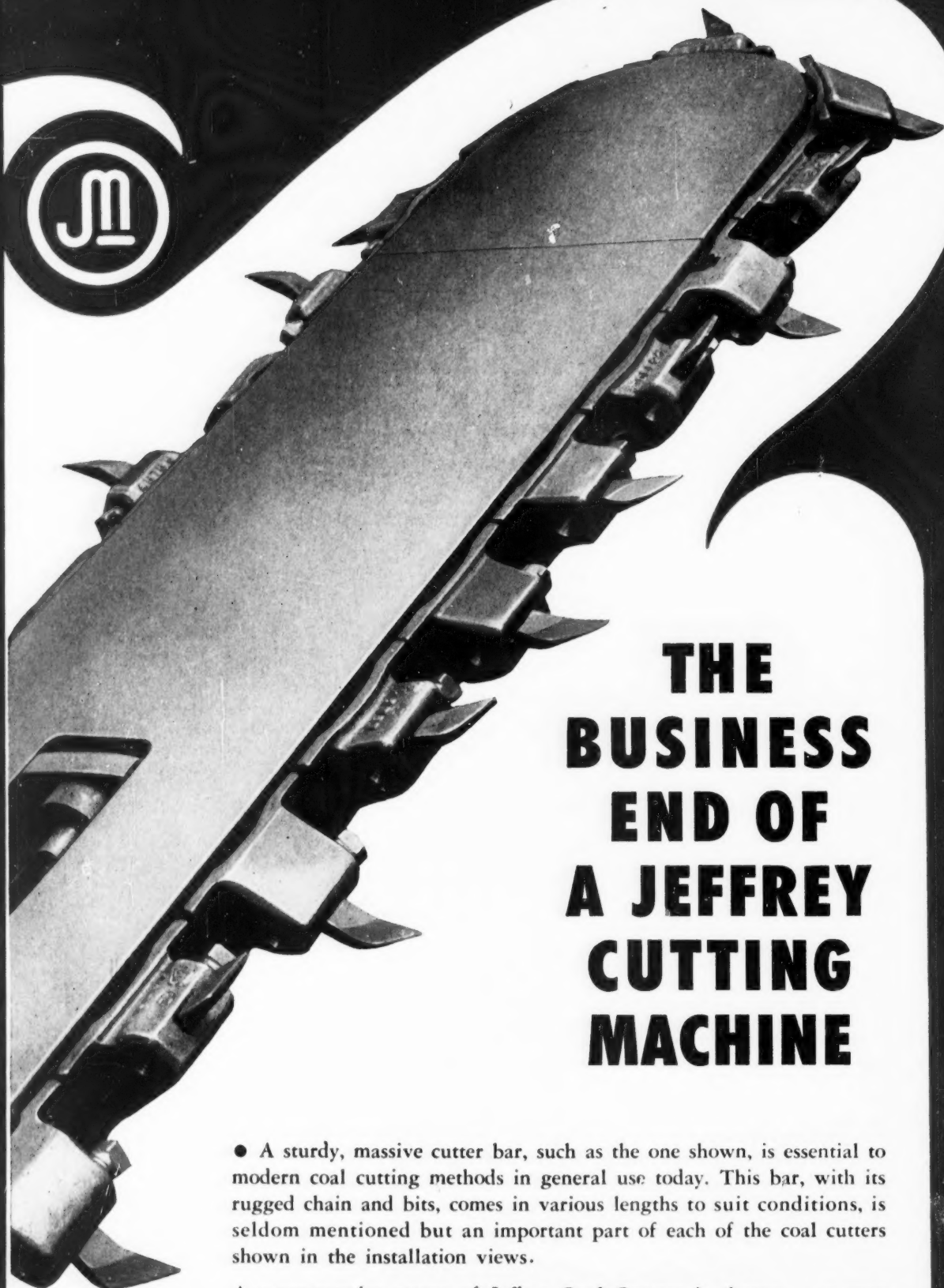
The general sales and operating offices will be moved immediately from Fairmont to Tazewell. There will be no interruption in the operation of the mines.

New offices of Hutchinson Coal are Huston St. Clair, President; C. E. Walker, Executive Vice President; and R. R. Bunton, Secretary Treasurer.

● A. S. Wilson, Vice President of the Boone County Coal Corporation, Sharples, W. V., has announced the appointment of E. H. Greenwald to be General Manager and T. W. Cline as Superintendent of the company's properties. Mr. Greenwald has been with the company since graduation from the University of Pittsburgh in various engineering, production and managerial capacities. Mr. Cline, who served the company for many years, more recently was General Mine Foreman.

● J. E. Briggs, Jr., Chairman of the Board of the Harman Coal Corp. and who was affiliated with a number of other coal interest, died at Delray Beach, Florida, Jan. 5. He served as President of the Williamson Coal Operators Association for many years. Burial was at Tazewell, Va.



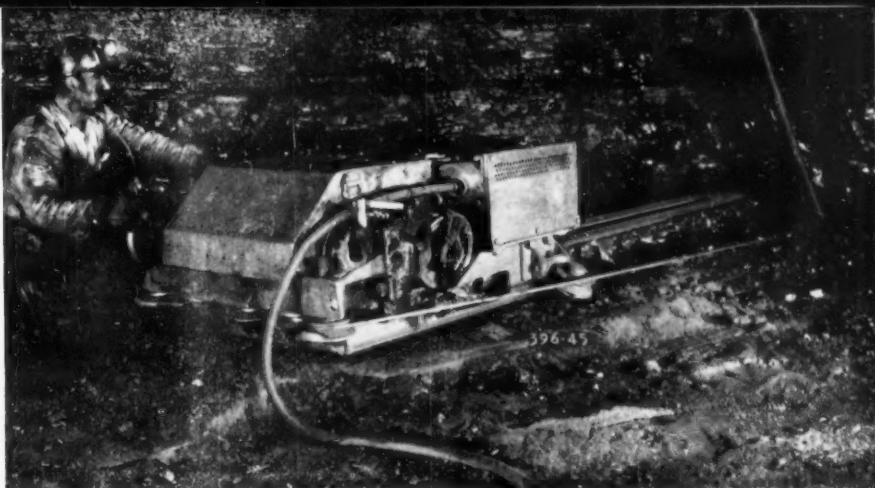


## THE BUSINESS END OF A JEFFREY CUTTING MACHINE

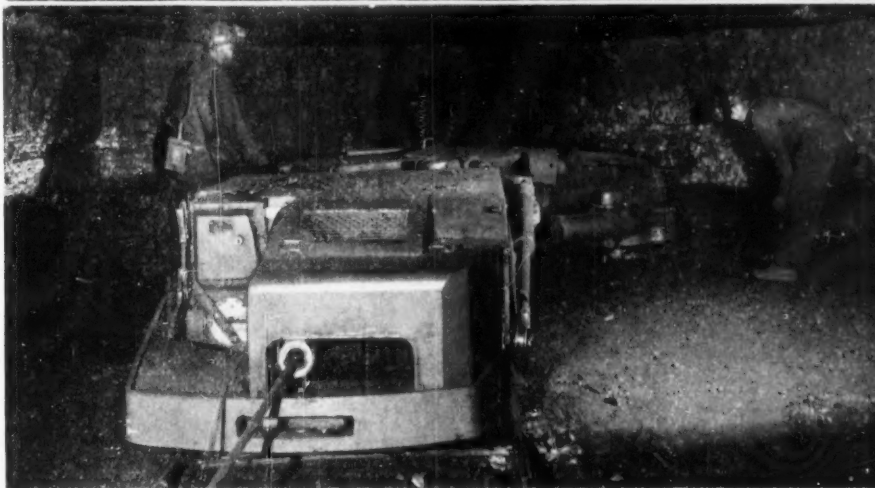
● A sturdy, massive cutter bar, such as the one shown, is essential to modern coal cutting methods in general use today. This bar, with its rugged chain and bits, comes in various lengths to suit conditions, is seldom mentioned but an important part of each of the coal cutters shown in the installation views.

A representative group of Jeffrey Coal Cutters is shown . . . a type and size from a full line of SHORTWALL cutters to the new rubber-tired UNIVERSAL type. Consult a Jeffrey engineer for complete details of these machines and for suggestions as to the one best suited to your operation.

The Jeffrey 35-B Shortwall Coal Cutter (right) operating in a low vein mine. Can be equipped with Slack Handling Device for removing cuttings. There is a unit in our line of Shortwall machines to fit your need exactly.



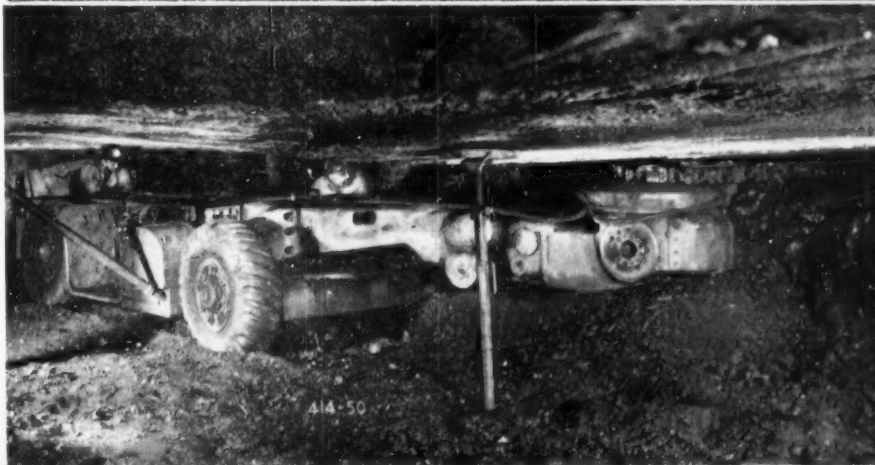
Jeffrey Universal Coal Cutters are very versatile. The 29-U track-mounted Universal cutter is shown (right) cutting. It is for mines where mine cars haul coal from the face. At bottom, right, is the Jeffrey 70-URB Universal Coal Cutter mounted on rubber tires. It is widely used for trackless mine operation in conjunction with Shuttle Cars.



Other equipment for both below and top ground operation:

Bucket Elevators	Feeders
Car Pullers	Idlers (belt)
Chains	Jigs
Conveyors	Loading Machines
Crushers	Locomotives
Drills	Magnetic
Fans and	Separators
Blowers	Pulverizers
Shuttle Cars	Screens

Jeffrey has the facilities and machines to mechanize your workings completely including Continuous Mining Machines and Conveyors to take the coal away. Write.



# JEFFREY





Over-all view of the operation.

## Scraper Wagons and Straight Scrapers Move All Overburden at M. H. Bigan Mine

The large number of coal stripping operations in most coal bearing territory, producing year in and year out, sometimes made one wonder how much longer such operations can continue. Up to now,

many coal stripping areas have been worked to their economic limits with present day machinery which at times made you think the end is not far off. As fast as one area was finished, however, an-

other would be found and the process seems never ending. Lately coal strip mines have been opened in areas far away from previous mines where coal has never been produced before and it seems safe to say that coal stripping on a large scale will be here for 50 years or more, allowing for normal improvement in machines.

Recently improved stripping equipment and better methods of working are allowing the reopening of some old, abandoned pits, but the larger number of new pits are being opened in new territory where the coal seam starts under comparatively low overburden. That kind of operation more readily permits experimentation with the new, improved earth moving units like the Caterpillar DW 20 scraper with 4-wheel rubber tire power unit and the D W 21 scraper with 2-wheel drive unit.



Tractor Pushing Overburden





Close-up of the WD-20 Scraper

The M. H. Gigan Coal Company has opened a 20 acre operation in the Miller "B" seam of coal near Reels Corners, on U. S. Route 30 in Somerset County, Pennsylvania. The coal runs from 26 to 30 inches in thickness. Overburden consists of top soil, yellow shale that hardens as cover gets thicker and slate on the coal. No shooting is required. Up to 55 feet of overburden is being moved with a Caterpillar D W-20 wagon powered scraper having 15 cubic yards struck capacity, 20 yards heaped, and 2-D W 21 two wheel drive scraper with the same capacity. The units are pushed in loading by a Caterpillar D-8 tractor. An advantage in using scrapers in an operation of this kind, and the reason for moving such high overburden to get so thin a vein of coal, is in hauling overburden out of the way. In this operation overburden is being hauled into the pits where coal has been removed. Backfilling is also eliminated and that saves, roughly, about 10 cents a ton.

A Model 820 Lorain shovel and an International T D 24 tractor are used for stripping, cleaning surface of coal and loading out coal.



Scraper being loaded with assistance of tractor.



Scrapers haul spoil into mined out pits



Left to right: John Ryan, Mine Safety Appliances Co.; A. R. Ferguson, Div. Supt. Pittsburgh Coal Co.; A. D. Sisk, Chief Dept. of Mines, Kentucky; W. G. Stevenson, Gen. Mgr., Hillman Coal & Coke Co.



Left to right: Joseph Bierer, Chief Detp. Mines, West Virginia; J. J. Snure, Production Manager, Rochester & Pittsburgh Coal Co.; Harry Dusz, Chief, Dept Mines, Ohio; J. W. Lowe, secretary of the Institute.

## Annual Meeting Coal Mining Institute of America

The 66th Annual Meeting of the Coal Mining Institute of America was held at the Wm. Penn Hotel, Pittsburgh, Pa., on December 11 and 12.

New officers for the coming year are: H. P. Greenwald, President; J. J. Snure, first Vice-Pres.; W. G. Stevenson, Second Vice-Pres.; T. G. Ferguson, Third Vice-Pres.

Managing directors, two year term, are J. A. Brookes, J. E. Elkin, D. C. Jones, D. J. Keenan, T. P. Latta. One year term: J. L. Hamilton, H. C. Rose, J. T. Ryan, Jr., G. A. Shoemaker, G. C. Trevor, W. E. Hart, T. E. Foster.

The affairs of the evening were under the Chairmanship of M. D. Cooper, Director, Mining Engineering Education, National Coal As-



M. D. Cooper.

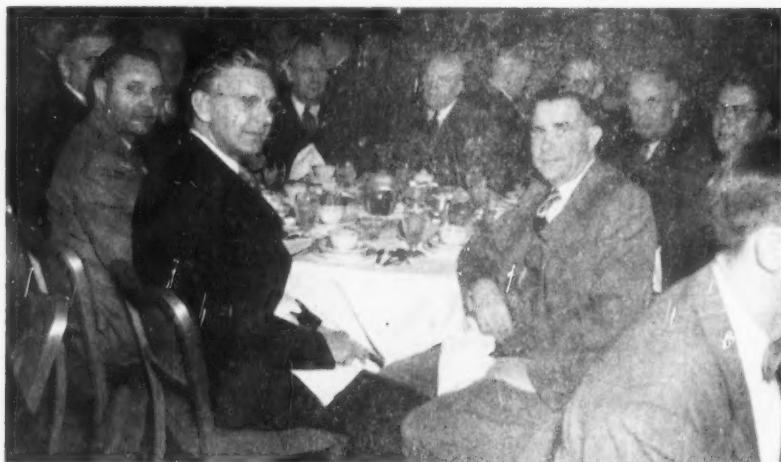
sociation. The speaker of the evening was Tom Pickett, Executive Vice President of the National Coal Association. His paper follows:

### COAL, COMPETITION AND CONGRESS

Let's look the coal business squarely in the face! Where do we stand? Where are we headed? We know that coal affects the life of every person and every productive activity in America directly or indirectly. We know that coal is absolutely essential to much of our economy; that it is tremendously useful in most of the rest. We also know that coal has no monopoly in today's fuel markets; that it has no monopoly in supplying the nation's increasing needs for light, heat and power.

Coal producers are highly competitive with one another. That is only part of the problem. There is the additional competitive battle with rival fuels and sources of energy—oil, gas and water power.

We know that America's coal reserves are the world's largest, and our coal production the biggest and most efficient. We take pride in the fact that, thanks to the generosity of nature, the industry's pioneering spirit, courage and inventive genius, and multiplied millions of dollars that have been expended for mining machinery and other working tools and plant facilities, the productivity of our coal mines is the envy of the world. At this time it is better than seven tons per man day as a national average. That is more than twice as much as the best record anywhere else on earth.



Left: J. H. Reitz, Republic Steel Corp.; E. M. White, Mine Safety Appliances Co.; George McCaa, Mine Inspector; George Deike, Mine Safety Appliances Co.; Wm. Affelder, Hillman Coal & Coke Co.; N. A. Alford, Consulting Engineer; J. P. Hastings, Hercules Powder Co.; A. P. Vance, George Hiles and S. A. Grubbs, of the Butler Consolidated Coal Co.



Left: Sam Hissim, Pittsburgh Coal Co.; Tom Clark and Reece Nichols, two retired Pittsburgh Coal Co. employees; L. V. Caulder, Cardox Co.; Dale Miller, Crucible Fuel Co.; Spencer Bowman, Asst. Chief Eng. in charge of Coal Mine Machinery, LeROI Co.; Dave Ridenhour, Gene Mauck of the Olga Coal Co.; Frank Strimlane, Cardox Co.; T. L. Simpson, Machinery Agent.



Left: E. G. Moffat, Sales Mgr., Firth Sterling, Inc.; Matt Kerr, Representative Austin Powder Co.; W. P. Spencer, Eastern Gas & Fuel Asso.; Frank Klesyk, Firth Sterling, Inc.; Neil Baker, Sales Mgr., Austin Powder Co.; H. A. McDowell, Eastern Gas & Fuel Asso.; H. A. Zell, Ross Cooch, and Bill Neff of Firth Sterling, Inc.

What about costs? The coal miners' wages are higher than those of any other laborer in American industry. I shall not debate the wage question. I simply remind you that in coal mining wages are at least 60% of the total production cost. The cost of everything else that enters into the production, preparation and distribution of coal has risen along with labor costs. I'm not afraid to say that coal production, like all other business, must operate at a reasonable profit. How can you pay ever-increasing wage and other costs without raising the per-ton cost of coal at the mine mouth to the point of no sale? It simply cannot be done and continue to operate at a profit.

We are encouraged by talk about coal's new horizons and bright future—that twenty-five years hence coal will supply a much larger share of the nation's total energy requirements. We are told that the nation's total requirements for energy will have doubled or tripled in that quarter of a century.

The nation's need for coal twenty-five years hence, according to some spokesmen, either in its natural state or in a converted form by processes already fully proven, will be the equivalent of a billion tons per year. These prophets blueprint an enormous undertaking; a capital investment of billions of dollars—new mines, preparation plants, synthetic fuel and chemical plants and transportation facilities. It is a glowing picture. However, producers can't balance today's budgets or solve today's problems on anticipated production twenty-five years from now. The hard fact is that the coal industry **today** is operating under most difficult conditions. Let's take a look at coal in today's



Left: M. L. Davis, U. S. Bureau of Mines; Isaac Vaughn, Arnold Snowden, Henry Roberts, all of the Ohio Div. of Mines; W. J. Fene, Chief, U. S. Bureau of Mines; G. P. Hahood, Salesman, Bethlehem Steel Co.; E. D. Thomas, Chief, Roof Bolting Section, U. S. Bureau of Mines.



Left: Don R. McCaa, Mine Safety Appliances Co.; George Rigg, Mgr. Mines, Weirton Steel Corp.; Bill Schiffbauer, Mine Electrician; Harry Swihart, Mine Supt.; Alex. Grant, Mgr. Mines, all three with the Youngstown Sheet & Tube Co.; Bill Schroeder, Schroeder Brothers; and on right end, J. Montgoremy, Manufacturer Representative.

competitive markets.

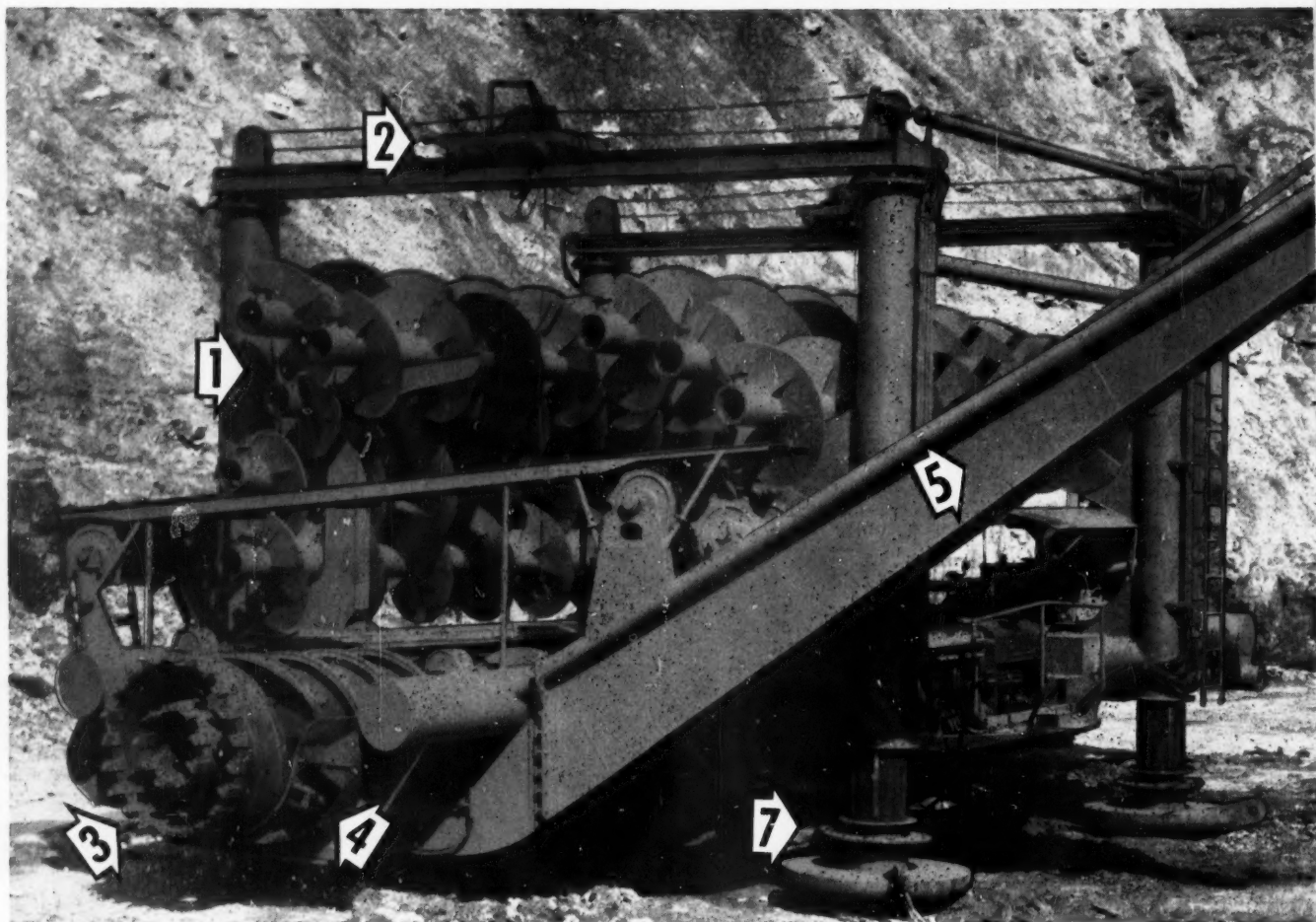
What is happening to our railroad fuel markets under the impact of the Diesel locomotive? The coal burned as locomotive fuel this year is not expected to exceed 33 million

tons. Five years ago (1947), it was 109 million tons; ten years ago (1942), 115 million tons.

Research engineers, in an enterprise to which some of the large

(Continued on Page 20)





# More Coal

## regardless of overburden...

*Recovers up to 700 tons  
per shift where overburden  
removal is too costly*

## COMPTON

When normal strip mining reaches an economical limit--where overburden removal is prohibitive--the Compton Auger paves the way to rapid high wall coal recovery at minimum cost. With proper planning, a practical 70% recovery is possible up to a depth of 200 feet from the high wall face.

Easily operated and low in maintenance cost, the Compton Auger is high in output... actual operations have proven up to 700 tons of clean, lumpy coal per normal shift with a maximum crew of 4 men.

The Compton Auger means increased production at lower cost... higher product quality through selective mining. Plan today to profitably extend your present operations or future developments with the use of Compton Augers.



## DESIGNED TO CUT OPERATION TIME!

The Compton Coal Auger is self-contained... no extra parts to be moved... no loose parts to be handled when the unit is ready to move and begin operation.

- 1 Auger sections conveniently racked at each side of the frame ready for transfer to operating position.
- 2 Hydraulically controlled, synchronized winches for handling auger sections.
- 3 Auger section can be placed in operating position in a matter of seconds.

- 4 Hydraulically operated pilot pan eliminates spillage between the machine and high wall.
- 5 Compton elevating conveyor is an integral part of the machine.
- 6 Hydraulically controlled, swivelling discharge turret chute assures uniform trimming of trucks.
- 7 Hydraulic jack legs with self-leveling pontoons that afford better floatation and allow drilling up to 200 ft. or more in depth without misalignment.

## SPECIFICATIONS

### Model 42

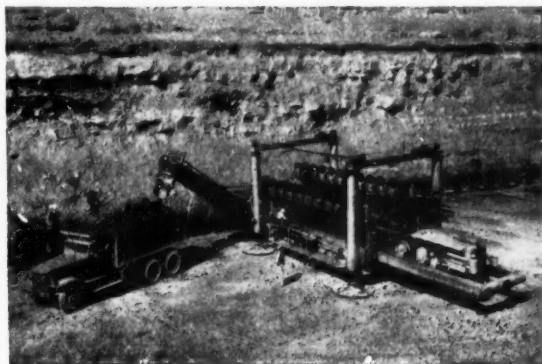
Length: 42 ft. Weight: Approx. 33 T. Carries nine 21 ft. auger sections. Required pit width: 45 ft. minimum. Power: 225 hp Diesel engine. Hydraulic frame jack lift: 66 inches. Auger Diameters: 48 inch to 30 inch. Possible drilling depth: 189 ft.

Hydraulic frame jack lift permits drilling of single holes or overlapping holes.

### Model 56

Length: 56 ft. Weight: Approx. 50 T. Carries six 34 ft. auger sections. Required pit width: 60 ft. minimum. Power: 300 hp Diesel engine. Hydraulic frame jacklift: 66 inches. Auger Diameters: 52 inch to 30 inch. Possible drilling depth: 201 ft.

# Self Contained Coal Auger



◀ In actual operation, the location of hydraulically-operated turret chute provides two-way loading approach for trucks. Truck maneuvering time is minimized... trucks are trimmed to full load without spillage.

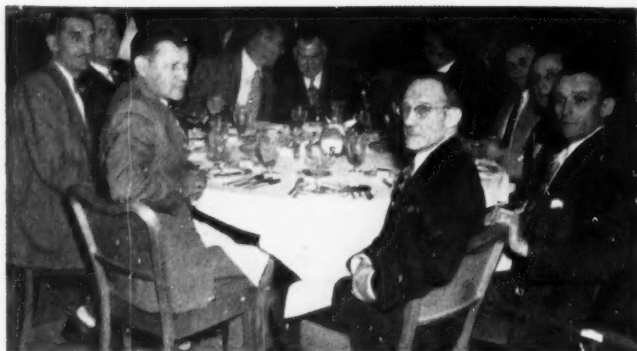
NOW—Latest Development in Auger Cutting Heads—A non-clogging head with built-in spider bearing assembly! This new cutter head increases production by drilling straighter holes with less frictional drag.



Consult a Compton Engineer for Details

**Compton, Inc.**  
ORIGINATORS OF COMPTON LUMP RECOVERY HEADS

BOX 1946 — PHONE 4-6384 CLARKSBURG, WEST VIRGINIA



Left: John F. Laser, Chief Elec.; John Petuk, George Thompson, John Wingard, John Errington, all Asst. Foremen; Joseph Polansky, Dispatcher; James Campbell, Asst. Foreman; J. Elwin Miller, Chief Clerk; Victor Wrbecky and J. K. Andrews, Engineer, all from the Butler Consolidated Coal Co.



Left: N. S. Sterling, G. J. Sarri, Perry Marlott, John Chedster, W. T. Gruber, W. N. Truxell, W. B. Beergower, George T. Fowler, Chas. A. Burchfield, Frank P. Miller, all of the Mining Dept. of the U. S. Steel Corp.



Left: Joseph Carter and W. F. Morris of the Weise Coal Co.; Harry M. Kittle, Tony Pawlosky, Mine Operator; John Schultz, Electric Mfg. & Repair Co.; R. L. Auchmuty of Evenson & Auchmuty, Consulting Engineers, Paul H. Weise, Mine Operator; George C. Kelly, Pittsburgh Coal Co.; S. R. McBride, Electric Mfg. & Repair Co.; P. J. Callaghan, retired mine inspector; Walter Carter of the Weise Coal Co.



Back row, left: D. R. Haake, Supt, Valley Camp Coal Co.; P. N. Hill, G. H. Pete, Jack Clellan, of the Mather Collieries Co.; Edgar Wood, Pittsburg Radio and Television Announcer; J. Berry, Mather Collieries. Front row, left: A. J. Gaber, A. H. Crayne, J. A. Brookes, of the Picklands, Mather & Co.; F. T. Taylor, Chief Eng., Valley Camp Coal Co.

#### ANNUAL MEETING COAL MINING INSTITUTE OF AMERICA

(Continued from Page 17)

coal-carrying railroads have contributed generously, are hard at work on the development of a gas turbine engine to be fueled with pulverized coal. They expect to develop a locomotive that will outperform the Diesel and restore to coal its proper share of the railway fuel market. We don't know how long it will take for that future prospect to become a reality.

A brighter side of coal's market picture is the big increase in the amount of coal used in the generation of electric power. The 1935-39 pre-World War II average was 37 million tons per year. Five years ago (1947) it was 86 million tons; ten years ago (1942) it was 63 million. Last year the tons of bituminous coal consumed by the electric utilities topped the 100 million mark for the first time in history. This year we expect to do as well or perhaps a little bit better.

That is not the whole story. Oil and gas are strong bidders for the business of supplying the electric utilities with their fuel. The fact is that they are getting an ever-increasing share of the total. I am not going to burden you with figures. It is enough to say that last year gas and oil used under boilers for electric power generation was the equivalent of 48 million tons of bituminous coal. A lot more natural gas and a lot more fuel oil are being burned under industrial boilers in other lines of production.

We have witnessed in recent years an amazing growth of pipelines for long distance transmission and distribution of natural gas. Nearly one billion dollars was spent





Left: Clyde Sechler, Dale Coe, John Sanbach, John Durfee, Herman Hess, Walter Cooke, Robena Mine, U. S. Steel Corp.; Ken Besco, Ohio Brass Co.; Art Goodwin, James Siclesmith, Leslie Anderson of the Robena Mine.



Left: Joe Marinski, Lindley Mine, Pittsburgh Coal Co.; Alfred Wooten, Fairmont Supply Co.; M. M. Fitzwater, Jr., Buckeye Coal Co.; F. D. Whalen, Mgr. Whalen Welding & Machine Co.; J. D. Whalen, Supt., Baton Coal Co.; E. L. Henderson, Fairmont Supply Co.; R. W. Mackensen, J. L. Carroll, Emil J. Servant and Ed Randolph, all of the Pittsburgh Coal Co.

in 1951 by natural gas systems for the construction of new transmission lines and the expansion of present facilities. More than 43,000 miles of pipelines have been authorized by the Federal Power Commission in the last ten years. The end is not in sight.

The inroads of natural gas into coal's markets is a matter of industry concern. It should be a matter of governmental concern in the public interest. The public interest requires a strong coal industry. To that end, attention should be directed to the conservation of the nation's natural gas resources. As a part of a conservation program, the burning of natural gas for inferior purposes should be restricted.

The question was posed in the report of the President's Materials Policy Commission: How can the nation minimize inferior uses of gas for which more abundant energy resources, notably coal, would serve as well—and, in the long run, at lower real cost to the nation—in order to maximize special advantage uses in which gas serves its highest economic function in the long run?

How can the nation avoid severe dislocation and heavy capital costs in transferring nearby and distant consumers to other fuels, and in abandoning pipelines, when the supply of natural gas turns downhill?

Serious consideration of the problem ought to be given by the new administration. An enlightened Federal Power Commission can well afford to take the steps necessary to preserve both the gas and coal industries before it is too late.

Another recent development of vital concern in the competitive picture is the importation of natural

gas from Canada. More is threatened. Efforts have been made to import gas from Mexico. The coal industry and other interested groups have opposed those proposals with limited success.

Foreign fuel oil has preempted a portion of coal markets on the Atlantic seaboard. Our government's recent agreement with Venezuela reducing the tariff rate on imported residual oil does not help coal's competitive position.

The issue goes far beyond the competitive aspects. It involves the national security, for the risk in making our nation's vital fuel supply dependent in the slightest degree upon shipments from abroad is inherent.

A discussion of these and other questions of concern to coal brings us face to face with the Federal government and its policies.

The one thing that affects business more than anything else is the Federal government. As an example, taxes alone represent the biggest single economic factor affecting business in general. A change of faces does not necessarily change the impact of the government on your affairs. It does create new problems.

Under a new administration we may have a lesser amount of governmental supervision, interference and control of business. It is not possible, however, to expect a rapid and entire relinquishment of government regulation. International relationships have far too much impact on our domestic economy to expect that. Therefore, we must accept the premise that we shall have to promote the interests of the coal industry before the Congress and administrative agencies with the same vigor as heretofore.

Accustomed for twenty years to dealing with the same administration, we must resurvey our outlook. In that resurvey we must discover the viewpoint of the new Congress and the new administration. It is interesting to note that in the new Congress there will be only two Senators who have served under a Republican administration—both of them Democrats. In the new Congress there will be only 22 of the 435 House Members who have served under a Republican administration—11 Democrats and 11 Republicans. There will be an entirely new Cabinet. Their advisory staffs will be new. Many present heads of bureaus and agencies will be replaced. There will remain, however, the thousands of so-called "little people" who have had much to do with policy-making of their superiors in past years. The question naturally arises how much will the little people who remain in the government influence the new administration's policies. We must take that into account in reviewing our own outlook.

Legislation by coalition of conservative Democrats and Republicans will undoubtedly continue on Capitol Hill in view of the paper-thin Republican majorities in both Senate and House. But the incoming 83rd Congress will meet in a changed atmosphere. Congress must decide what it will do about existing legislation which expires during 1953 and early 1954. These important measures, relating principally to taxes and controls, and including the Reciprocal Trade Agreements Act, are the basis of our economic and military preparedness program. They, of course, affect the public welfare in general as well as the coal industry in particular.

The present corporate excess profits tax expires on next June 30 by statutory limitation unless Congress takes affirmative action. The same thing happens with the most recent increase in individual income tax rates which is due to expire December 31, 1953. The most recent increase in the corporate income tax rate expires on April 1, 1953, and on that date expire various increases in excise taxes.

The continuance, modification, or abandonment of these various taxes by the new Congress is a matter of important concern to every one of us.

Of particular interest to the coal industry will be the attitude of the 83rd Congress toward the hard-won increase in the percentage depletion allowance for coal—our long fight to secure Congressional recognition of the tax inequity between coal and its competitive fuels, oil and gas. We must be vigilant to preserve this gain and protect it from the probable attack by those who fail to appreciate the necessity for its inclusion in the Federal tax structure.

On April 1, 1953, 48 emergency statutes will expire. The new Congress will have to determine at an early date the disposition of those which may be regraded as essential to the defense and emergency programs.

The price, wage and rent provisions of the Defense Production Act (allocation and priority powers) expire on next June 30. Whether such controls will be permitted to die appears to depend on the status of the Korean conflict, economic conditions prevailing at the time, and the temper of the new Congress.

The so-called inherent power of presidential seizure, which Mr. Truman attempted to exercise in the steel strike last Spring, was struck down by the courts and judicially declared to be nonexistent. The Supreme Court, in a far-reaching decision, divided 6 to 3 on the question. That dictatorial theory of government is not likely to again raise its unconstitutional head.

The underlying need is for Congressional action to protect the nation from the consequences of unrestrained exercise of union monopoly power, legislation that deals with the cause rather than the effect. The new Congress surely will be faced with this question and with many bills for this purpose.

Social Security legislation is certain to receive the early attention of Congress. The present authority for the states, rather than the Federal government, to define "disability" for payments of benefits under the Social Security system expires on June 30, 1953. Also, the period during which a voluntary agreement for coverage of state and local employees under the Social Security Act may become effective on a subsequent date expires on December 31, 1953. And on September 30, 1954, amendments to the Social Security Act relating to payments to states for old age assistance, dependent children and to the blind and disabled expire automatically unless renewed by Congress.

The employer's contribution to Federal Social Security is a percentage measured by his payroll. The amount of the employer's Social Security payments is an item in his operating costs. In the case of an industry such as ours where the payroll constitutes so large a percentage of the total production cost, a tax that is measured by the size of the payroll is correspondingly large and adds more to operating costs than in the case of businesses where labor cost is a relatively small per cent of the total production cost. That is one reason why we have cause to be deeply concerned with the increases, present or prospective, in the contributions required by the Social Security Act.

Foreign fuel oil, heretofore referred to, has an adverse effect upon both the coal industry and the independent producers of oil in the United States. Early in 1950 the coal industry embarked upon a major campaign to arouse Congressional interest in the damage being done to coal markets by foreign fuel oil. Congress was asked to impose an import excise tax of \$1.05 per barrel on foreign residual fuel oil, or, in the alternative, to set up an import quota limiting imports to 5 per cent of the previous year's domestic run to crude stills. The Korean war intervened and proposals for the limitation of foreign fuel oil were pigeonholed. But, in recent months, the importation of foreign oil has presented new competitive difficulties.

Congress ought to examine that question again. A proper resolution of it will help relieve the coal industry of that unfair competition.

The threat inherent in domestic

natural gas competition, together with invasion by foreign gas from Canada and Mexico, actual and threatened, justifies another approach to the problem of protecting the interests of the coal industry. Consideration ought to be given to amendment of the Natural Gas Act and an improved administration of the principles involved, all in the public interest.

The much-discussed St. Lawrence Seaway and Power Project will again be an issue as it has been for more than twenty years. In the last Congress the Senate Foreign Relations Committee reported the bill to the floor without recommendation. In June the Senate voted to send it back to committee for further consideration. In the House Committee on Public Works, the St. Lawrence proposal was a very controversial issue. The committee at one time tabled all bills on the subject. At that time I was privileged to be a member of the committee. Others were later introduced but never voted on.

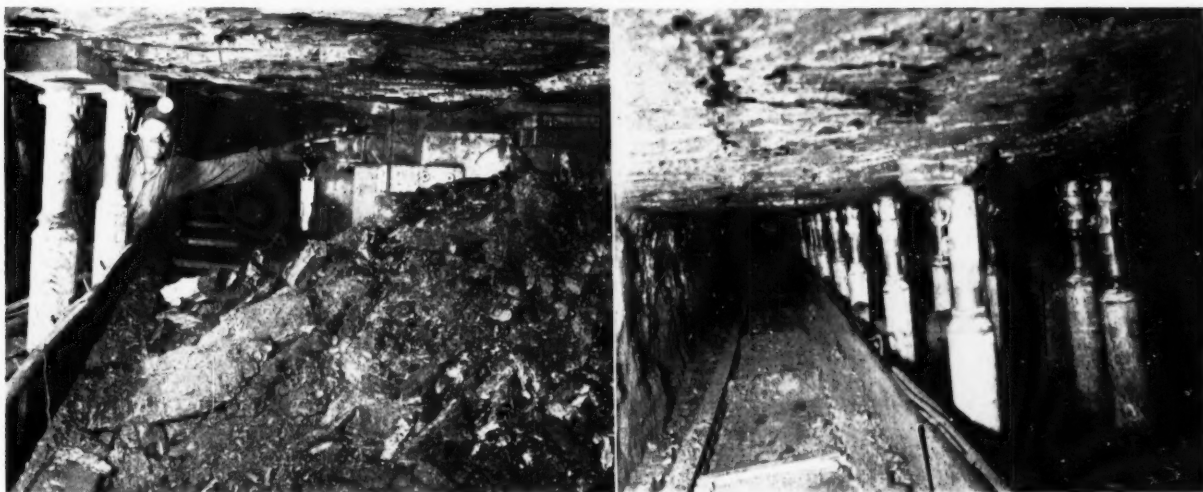
Applications for authority to develop hydro-electric power on the St. Lawrence River are now pending before the Federal Power Commission.

The coal and other industries continue to oppose the construction of the St. Lawrence Project by the government for a number of valid reasons, principal among them being the tremendous cost to the taxpayer with benefits to a relatively few and government competition with private enterprise.

These are only a few of the questions affecting the coal industry and its competitive outlook as they may be influenced by the government.

Competition under our free enterprise system not only fosters efficiency and progress, it demands them. Those who are charged with supplying America with coal are meeting these demands. Our industry is demonstrating the results of able and forward-looking management and efficient operation.

It has never had a dollar of government subsidy. Coal operators have spent their own money to improve their properties, to build preparation plants, and to open new mines to replace those that were mined out or pinched out by high operating costs.



## Picture Story of the Underground Coal Planer at Barnes & Tucker Coal Company

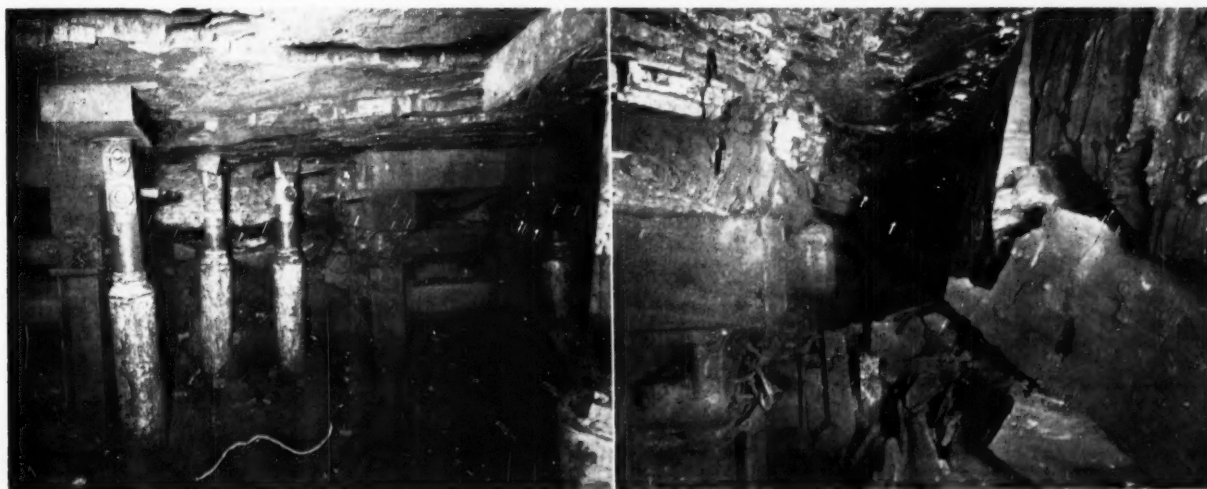
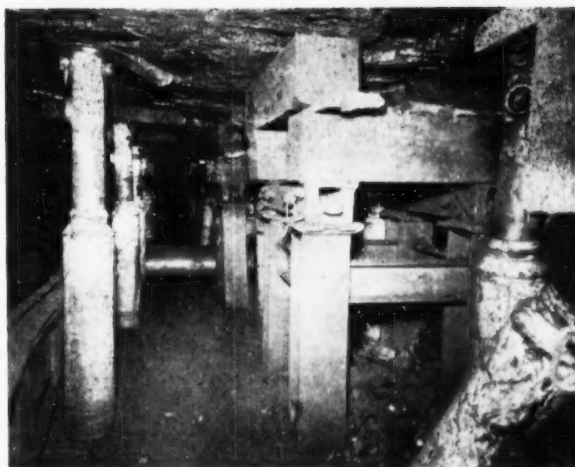
Top left: Stripper making 2½ foot cut into longwall face.

Top right: Flight conveyor along face onto which the stripped coal falls.

Middle: Air operated plunger between jacks and cribbing pushes conveyor to face after each cut.

Lower left: Method of holding roof until ready for fall.

Lower right: Showing fracture of roof after fall.





## We Are Badly In Need of Scientific Talent

● Previous ages had their tragedies as will future ages. The tragedy of the present age is that too many of us do not understand science. Accumulation of knowledge by man about nature over ages is science. The automobile, radio, atomic energy, television,

radar, jet rockets are all products of science.

We have science because man realizes that it is better to know than to be ignorant-knowledge is better for man's sake. Through science man is getting things he wants, like machines to relieve him

of slavery, cures for disease and thousands of things that advance human welfare.

Generally the scientist sticks to finding out facts about nature. The technologist uses knowledge of science to develop or design things man wants. The engineer, a type of technologist, uses knowledge which has been discovered to design better things. Searching for background knowledge to meet some of the practical needs of man, some technologists become scientists.

Discovery to practical application is generally a painful, long road of trial and error, of discovery leading to new discovery, to new technology. The beginnings of nuclear physics date back 40 years.

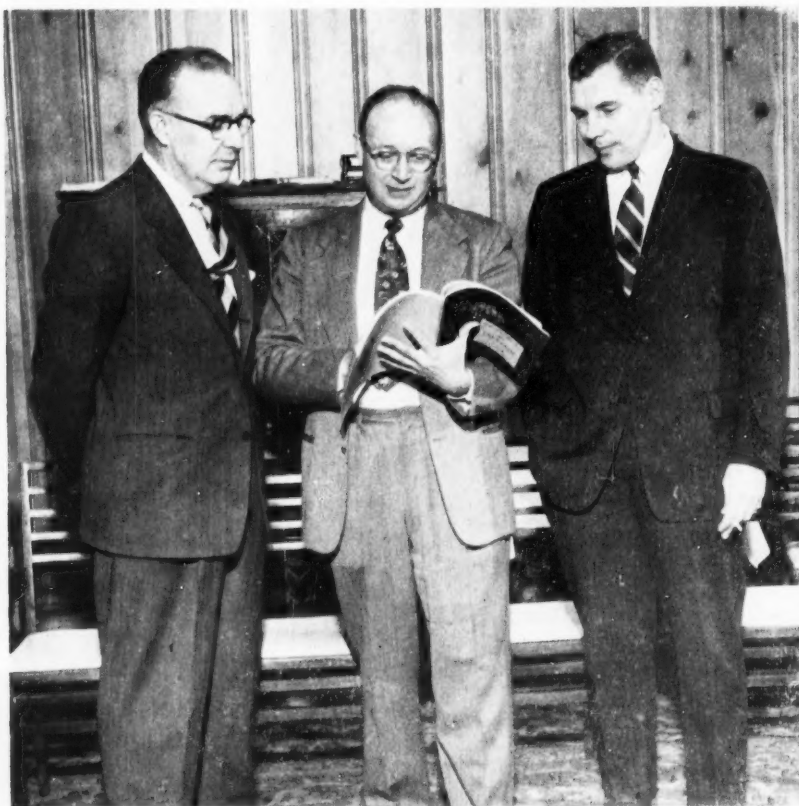
We have hardly begun the process of learning about nature and using what we have learned to devise better ways of living. Vast educational programs are necessary before we get full benefits from our present technological knowledge.

Thousands of High School Seniors tried to answer the questions given here in tests to rate their Potential Scientific Ability. These were part of the National Science Talent Search designed to seek out research talent among the youth of the nation.

Do you have potential scientific talent? You can get some idea by taking this science quiz, made up of a sample of the questions in the two-and-one-half-hour Science Talent Search test, just completed by thousands of high school seniors throughout the country.

Each year since 1942 more than 15,000 high school seniors have attempted this test. Only about 2,000 have been able to complete the test and fulfill other qualifications each year. Of these, 40 go to Washington every spring to take part in the annual Science Talent Institute and compete for thousands of dollars in scholarships.

Another 260 receive honorable mention each year and most of these are offered scholarships by colleges and universities all over the nation. The Science Talent Search is supported by the Westinghouse Educational Foundation and conducted by Science Clubs of



● The ninth session of the University of Pittsburgh's course on Management Problems for Executives opened October 13 and continued through December 5 with more than 70 executives attending.

The University's School of Business Administration offers this course with two main objectives: (1) to develop the ability of the participant to think and act like an able executive and (2) to broaden the vision of the participant beyond the departmental areas in which he is working and interest him in all the aspects of industrial management that are essential to successful business operation.

Two hundred and ninety-two industrial executives have attended the first eight sessions of management problems for executives.

Their average age was forty. They came from eighteen states, the district of Columbia, and twelve foreign countries and represented more than 25 private industries, the United States Air Force, United States Army, United States Navy, and the United States Marine Corps.

Men from your company shown in the picture are:

Elmus Luther Snoderly, Treasurer, Consolidation Coal Co., Fairmont, W. Va.

Melville H. Ireland, Mine Superintendent, Christopher Coal Co., Pursglove, West Va.

Robert Walter Turkes, Professor of Industrial and General Engineering and Head of Departments (Engineering), University of Pittsburgh.

America, administered by Science Service.

The task of seeking out potential science talent grows more urgent each year. Although the nation has doubled its number of scientists in the past 12 years, the demand for them still keeps well ahead of the supply. The need to stay ahead of the Soviets in technology makes imperative the training of still more scientists, technicians and engineers.

The Soviet Union has also made great progress in the number of scientists it has trained. Its progress has been good enough to deny this country complacency in our record of training new scientists.

The Science Talent Search represents a scientific method of seeking out each year those high school seniors with the greatest aptitude for scientific careers. But it does more. In high school after high school, records show, the very existence of the test, the interest manifested in it, serve as spurs impelling many students toward a study of the sciences.

When you try these questions, none of you, it can be confidently predicted, will answer them all correctly within the time limit. None of the thousands of high school seniors who will take the test in future years will ever make a perfect score. None ever has. Even the most brilliant scientists, firmly established in their careers, would most likely miss some of the questions on the full test.

If you decide the test is too tough for you, or if you start it and then do not finish it, you will react as many thousands of high

school seniors did. The test is made especially difficult, partly in order to eliminate all but the persevering. Perseverance is a quality especially necessary in scientific research.

The test is designed to measure science aptitude, not legal aptitude, nor other kinds of aptitude. Failure, therefore, means only that your aptitude probably does not lie in science.

As a matter of fact, very few people are gifted with the special abilities which made good scientists. This nation now has only about 200,000 scientists. About 46,000 of these have earned Ph.D. degrees. In addition, there are about 500,000 engineers and about 300,000 physicians, veterinarians and others in the health field.

Very few of this group can be called research scientists, devoting their time to seeking out the answers to the fundamental questions proposed by nature.

Ready now to test yourself? There are three parts to the test. You should be able to answer the sample questions, released here for the first time, in not more than a half hour. These questions, on the average, are from the earlier sections of the test, although 12 and 45 in Part A and 81 in Part B are among the toughest in the full test. Questions 1 and 2 in Part A are among the easiest.

Place an X next to the answer you think most nearly correct in each question in Part A. In Part B, first read the paragraphs that precede the questions and then use an X to indicate the answer in each question you think most nearly cor-

rect. Pick the correct answer in Part C.

Time yourself so you do not go over one-half hour and answer all the questions in one session.

After you have completed the test, score yourself, using the correct answers printed elsewhere.

The 40 high school seniors who come out on top will be in Washington Feb. 26 through March 2, for the Twelfth Annual Science Talent Institute. They will meet and talk with leading scientists, visit some of the extensive government research laboratories, hear scientific lectures and attend a final banquet when the winners of the \$11,000 in scholarships will be announced, and receive special gold Science Clubs of America pins.

The science aptitude test was compiled by two of the four judges of the Science Talent Search; Dr. Harold A. Edgerton, vice-president, Richardson, Bellows, Henry & Co., New York, and Dr. Stuart Henderson Britt, vice-president and director of research, Needham Louis & Brorby, Inc., Chicago.

\* \* \*

### HERE ARE THE ANSWERS TO THE SCIENCE QUIZ

Now that you have taken the science aptitude test, you are ready to check your answers.

Correct answers to Part A are: 1, 2; 2, 4; 3, 1; 4, 4; 5, 4; 6, 4; 7, 3; 8, 3; 9, 1; 10, 3; 11, 3; 12, 4; 28, 1; 45, 1.

Correct answers to Part B are: 53, 3; 54, 2; 80, 3; 81, 2.

The correct answer in Part C is: 105, 4.

(Continued on Page 29)



Left: R. W. Clawges, Clyde Coal Co.; Roy C. Kindlig, Shannon Falls Mining Co.; A. K. Bloom, Clearfield Bituminous Coal Corp.; Ray S. Walker, Bradford Coal Co.; and Roy Lutz, stripper.



Left: Lew Lenz, G. Meiklejohn, A. Sabolovic, N. F. Sarver, J. J. Janssen and J. F. Dacherty, all of the Highway Equipment Co.

# THE TWELFTH ANNUAL SCIENCE TALENT SEARCH (1953) SCIENCE APTITUDE EXAMINATION ANSWERS

**DIRECTIONS:** Four possible answers are given for each question. Put an X in the parentheses in front of the number corresponding to that answer which you think is most nearly correct.

1. What are the missing words in the following sentence? "The terms, \_\_\_\_\_ and \_\_\_\_\_, refer to the workability of metals."

- ( ) 1 ductile—hobbing  
( ) 2 ductile—malleable  
( ) 3 hobbing—toning  
( ) 4 malleable—toning

## PART A

2. Which of the following best defines the environment of an organism?

- ( ) 1 its location in reference to material and social causes and effects  
( ) 2 the land, air, or water on which or in which it lives  
( ) 3 the locality where it lives  
( ) 4 the surroundings and conditions in which it lives

3. This diagram is most likely to be found in a book on

- ( ) 1 aeronautics  
( ) 2 biometry  
( ) 3 limnology  
( ) 4 psychometry



4. Fluorides are added to drinking water in order to

- ( ) 1 improve fertility  
( ) 2 increase metabolism  
( ) 3 prevent typhoid fever  
( ) 4 reduce caries

5. The number of calories necessary to raise the temperature of 13 grams of water from 25° C to 34° C is

- ( ) 1 669  
( ) 2 90  
( ) 3 130  
( ) 4 1170

6. Density may be measured in terms of

- ( ) 1 coefficient of resistance  
( ) 2 grams per square centimeter  
( ) 3 impermeability to water  
( ) 4 pounds per cubic foot

7. Which of the following is not a mammal?

- ( ) 1 platypus  
( ) 2 porpoise  
( ) 3 turtle  
( ) 4 whale

8.  $\text{Ca}(\text{H}_2\text{PO}_4)_2$  is used in

- ( ) 1 alloys  
( ) 2 dentifrices  
( ) 3 fertilizers  
( ) 4 pigments

9. In general, the energy carried by a sound wave increases with the

- ( ) 1 amplitude  
( ) 2 complexity  
( ) 3 period  
( ) 4 wave-length

10. Thorium is a

- ( ) 1 bone of mammals  
( ) 2 food preservative  
( ) 3 metallic element  
( ) 4 satellite of Jupiter

11. What are the missing words in the following sentence? "Lenses in eyeglasses for far-sighted persons are \_\_\_\_\_ or \_\_\_\_\_."

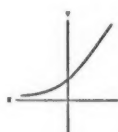
- ( ) 1 concave—magnifying  
( ) 2 concave—reducing  
( ) 3 convex—magnifying  
( ) 4 convex—reducing

12. Which of the following is found in the greatest quantity in automobile exhaust gases?

- ( ) 1 carbon monoxide  
( ) 2 carbon tetrachloride  
( ) 3 sulfur trioxide  
( ) 4 water

20. This curve is

- ( ) 1 exponential  
( ) 2 Gaussian  
( ) 3 ogive  
( ) 4 transcendental



45. This is a diagram of a

- ( ) 1 catenary  
( ) 2 catenoid  
( ) 3 cisoid  
( ) 4 hyperbola



## PART B

### SECTION B

Hunger, like the other appetites, is more powerful in impelling men to action when the means for its appeasement are difficult to procure and the possession of the means insecure over a period of time. In primitive cultures, therefore, hunger as a drive plays a more important role than in advanced societies. This distinction does not hold for all individuals in a society because societies do not advance as units. Nevertheless, a nutritive deficiency leading to hunger contractions is relatively less frequent among the unemployed in modern society than among those primitive groups which rely upon hunting for their sustenance.

### QUESTIONS ON SECTION B

53. Which of the following inferences can most properly be made on the basis of the statements in the paragraph?

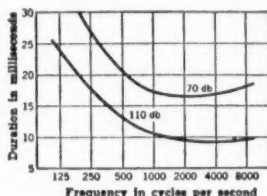
- ( ) 1 Hunting is always a necessity, and never a sport, in primitive societies.  
( ) 2 Members of advanced societies spend much less time thinking about food than members of primitive societies.  
( ) 3 None of the other three conclusions given here can properly be inferred on the basis of the information given in the paragraph.  
( ) 4 The hungriest people in advanced societies have, nevertheless, more to eat than the best fed members of primitive societies.

54. On the basis of the paragraph, which of the following statements is most tenable?

- ( ) 1 A society is composed of individuals who do not respond differentially to the same drive.  
( ) 2 Equally unsatisfied appetites are stronger drives in primitive societies than in modern societies.  
( ) 3 Hunger is a more powerful drive to action than the other appetites.  
( ) 4 Society is homogeneous in its changes.

### SECTION I

The diagram shows the minimum durations necessary for a tone to sound like a tone



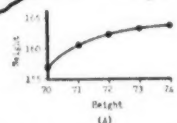
### QUESTIONS ON SECTION I

80. According to the graph, which of the following statements is most nearly true?

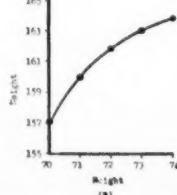
- ( ) 1 The higher the frequency of tones, the greater is the loudness, when duration is equal.  
( ) 2 The pitch of tones is expressed in decibels.  
( ) 3 Tones in the lower frequency range require greater duration to be heard than tones of higher frequencies.  
( ) 4 Tones must last almost 610 seconds before they sound like tones.

81. The minimum durations shown were probably established on the basis of

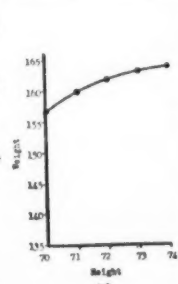
- ( ) 1 measurement of one complete sine wave.  
( ) 2 judgments of recognizing a tone or a click measurement by means of a loudness meter.  
( ) 4 the logarithmic relationship of duration and pitch.



(A)



(B)



(C)

## PART C

**DIRECTIONS:** Four possible answers are given for each of the remaining questions. Put an X in the parentheses in front of the number corresponding to that answer which you think is most nearly correct.

105. Following is the average height in inches, and weight in pounds, of a given population.

Height	Weight
74	164
73	163
72	162
71	160
70	157

Which of the following graphs—A, B, or C—is the correct representation of the data?

- ( ) 1 A  
( ) 2 B  
( ) 3 C  
( ) 4 All are correct

Ques. Ans.

1. 2

2. 4

3. 1

4. 4

5. 4

6. 4

7. 3

8. 3

9. 1

10. 3

11. 3

12. 4

13. 2

14. 4

15. 2

16. 2

17. 2

18. 2

19. 4

20. 3

21. 3

22. 2

23. 2

24. 3

25. 1

26. 2

27. 3

28. 1

29. 4

30. 2

31. 1

32. 1

33. 2

34. 3

35. 2

36. 1

37. 1

38. 2

39. 3

40. 4

41. 2

42. 2

43. 4

44. 1

45. 1

46. 1

47. 1

48. 3

49. 2

50. 2

51. 2

52. 2

53. 3

54. 2

55. 4

56. 3

57. 3

58. 2

59. 1

60. 2

61. 3

62. 3

63. 3

64. 1

65. 4

66. 1

67. 2

68. 3

Ques. Ans.

69. 3

70. 1

71. 2

72. 4

73. 4

74. 2

75. 3

76. 2

77. 1

78. 2

79. 2

80. 3

81. 2

82. 3

83. 2

84. 2

85. 2

86. 4

87. 1

88. 3

89. 1

90. 4

91. 4

92. 4

93. 3

94. 2

95. 2

96. 1

97. 1

98. 3

99. 1

100. 3

101. 4

101.2 9

101.3 1

101.4 3

101.5 5

102.1 5

102.2 11

102.3 3

102.4 7

102.5 6

102.6 1

103.1 2 or 6

103.2 3 or 5

103.3 4

103.4 7

104.1 argon

104.2 boron

104.3 carbon

104.4 fluorine

104.5 iodine

104.6 potassium

104.7 nitrogen

104.8 oxygen

104.9 phosphorus

104.10 sulphur

104.11 uranium

104.12 vanadium

104.13 tungsten

(wolfram)

104.14 yttrium

105. 4

106. 2

107. 1

108. 2

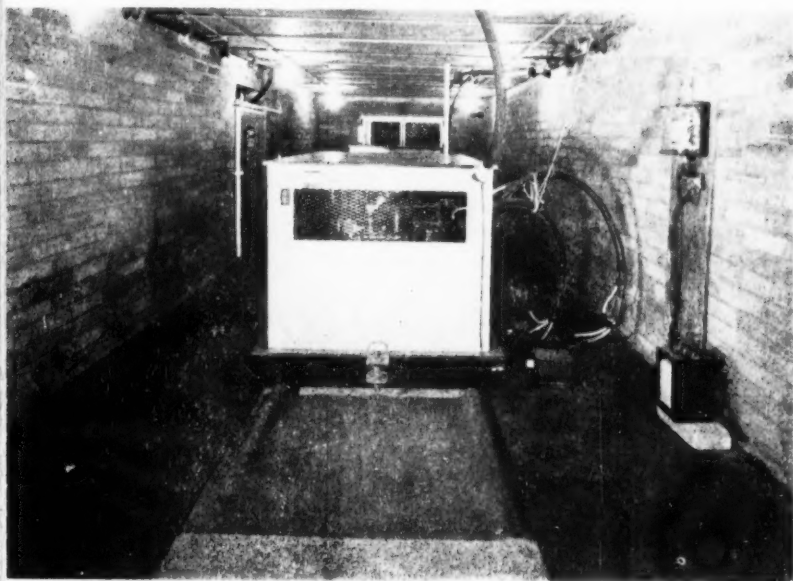
109. 3

Note: A score of 79 for boys and 67 for girls was required to be considered for national honors. The score ranged from 25 to 111 for boys and 17 to 108 for girls.



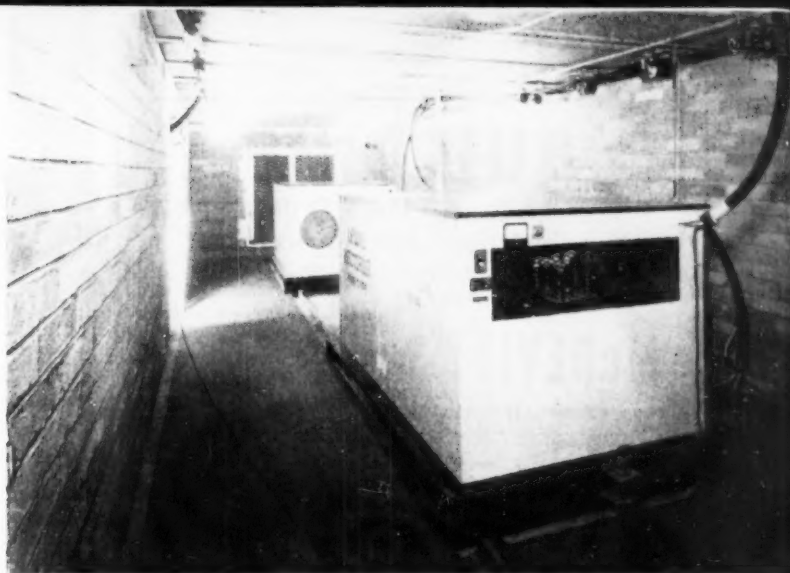
## Selenium Rectifiers in the Coal Mining Industry

Below: Front view of the 275-v, 300 kw Lewis Selenium Rectifier in underground mine of Crucible Fuel Co., Crucible, Pa. Front unit has 2300-v incoming breaker and rectifier transformer equipment with 11-step manual tap changer.



Consisting of stacks of metallic rectifier plates suitably arranged with transformer and switchgear, Selenium Rectifiers are attracting attention in converting electric power from AC to DC in mining and industrial applications in voltages up to 550 and capacities up to 500 K. W.

In favor of the Selenium Rectifier is low initial cost. Maintenance is also low. There are no moving parts. No warm-up period is necessary—action is instantaneous. If there is no load, there is

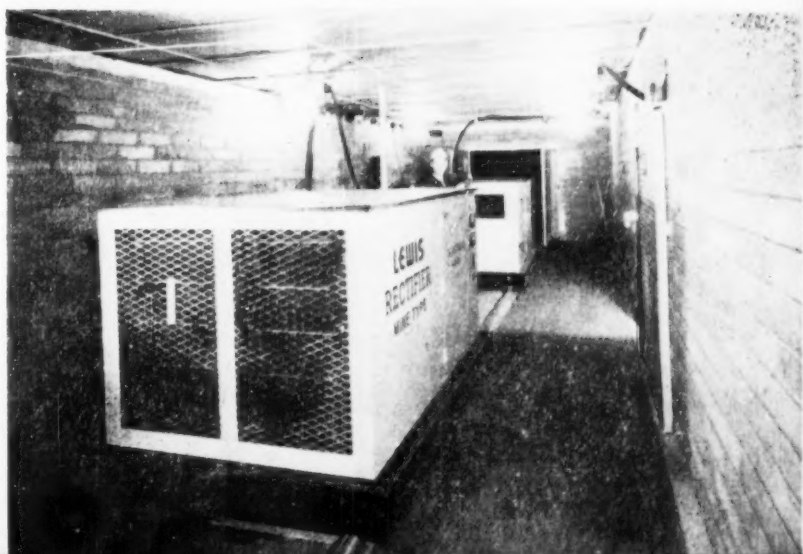


Side view from front, showing front and back units.

no power consumption. It has high overload capacity and relatively high efficiency.

Disadvantages are premature ageing of completely destroying the selenium plates by exceeding overload limits. Inherent voltage drop of about 8 percent at full load when relatively expensive auxiliary voltage regulating equipment is not used, which must be considered along with drop in DC circuit and variation in AC supply voltage.

Below: Side view from back, showing back units made up of selenium stacks and dc breaker. Entire unit is paralleled with mercury arc rectifier and M. G. set which help supply the DC power. This unit was made by the Lewis Electrical Mfg. Co., and sold by the S. E. Gane Co., Pittsburgh.



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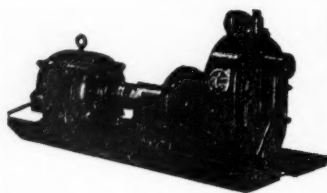
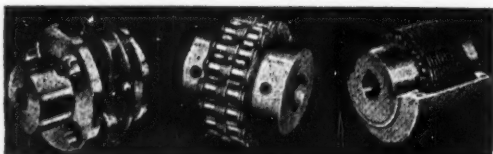
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• A new 20 ft. long, 20 cubic yd. capacity package trailer dump is announced by The Galion Allsteel Body Company, Galion, Ohio.

Known as Galion Heavy Duty Model 12, the body has 16 yd. sides and 20 yd. ends with a semi-bay front.

Dumping is handled by a Galion Model 77380 hoist. This consists of two 3-section 7 inch telescopic units. Rated hoist capacity is 22 tons.

The tandem axle trailer has a specially designed heavy duty dump trailer suspension. Trailer utilizes a straight top frame with ample section and roll to support the most rugged operation. It is available with either hose operation or power fifth wheel, as desired. Tire sizes and brakes are available in several options to meet load and service requirements.

## WE ARE BADLY IN NEED OF SCIENTIFIC TALENT

(Continued from Page 25)

Of the 19 possible correct answers, if you achieved 15 or higher, you can consider that pretty good. If you got eight or less, that was not so good. Your talents probably lie in other fields. Those who could do as well as the equivalent of 15 on the entire test would have been in the running for consideration for honors in the National Science Search.

\* \* \*

The 40 tripwinners, 15 to 18 years of age, were chosen by a panel of judges after a nation-wide competition in which top-ranking seniors in all the public, parochial and private schools in the continental United States were invited to participate. Entrants, representing every state in the Union, totaled 14,260, of whom 64 completed the stiff science aptitude examination, submitted recommendations and scholarship records, and wrote a report on "My Scientific Project."

At the end of the winners' five-day stay, Feb. 26 through March 2, the judges will award the scholarships. One boy or girl will receive the \$2,800 Westinghouse Grand Science Scholarship (\$700 per year for four years). The runner-up will receive a \$2,000 Westinghouse Science Scholarship. Westinghouse Science Scholarships, ranging in size from \$100 to \$400 and bringing the total to \$11,000, will be awarded at the discretion of the judges to the rest of the winners.

The scholarships may be used at any college, university or technical school of the winners' choice so that they may continue their training in science or engineering.

Exactly 70% of the winners' fathers and 60% of their mothers attended college. A number have parents who were born or educated abroad. Three-fourths of the winners claim no scientists among their relatives, the other 10 have one or more scientists among their close or distant relatives.

Contrary to a frequent conception about scientists, the winners are not interested in science only. While most of them spend much of their spare time in science pursuits such as science clubs and individual hobbies of a scientific nature, all of them have participated in varied extracurricular interests such as music, athletics, journalism and dramatics, and all belong to social and educational organizations outside their school work.

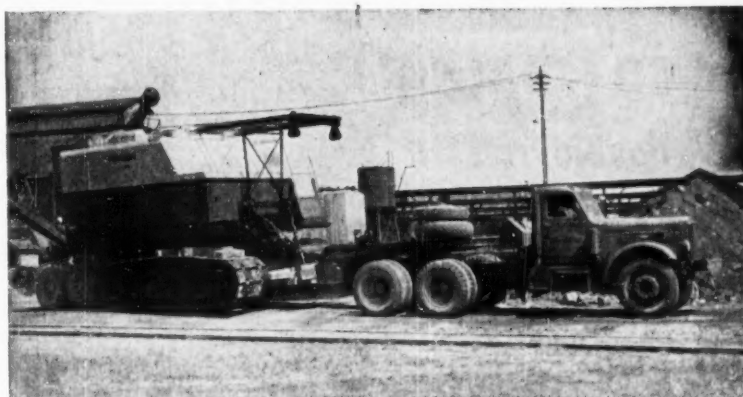
Many of the top 40 have already chosen the lines of study they wish to pursue. Physics attracts eight, while 11 lean toward careers in engineering and four intend to study medicine. Others plan careers in geology, mathematics, chemistry, biology, entomology, paleontology, geochemistry and zoology. All hope to do research in their respective fields.

Children of coal mining men can enter these scientific talent contests. The coal industry has produced its share of other talents in athletics, music, etc., and it can produce scientists.

● "Three times longer life between grinds" is the report from users of the new carbide tipped auger drill head. Used in both post mounted and hand held drilling, this new line of Vascoloy-Ramet bits, Style DB, departs in tip design from the ordinary type auger heads.

By providing the larger area "B" (see Fig. 1) the DB bit gives double the tool life as compared with area "A" of the regular type bit. Ordinary auger drills keep the entire area "X" (see Fig. 2) in contact when drilling, increasing load and fines while the DB drill has only the small area "C" in con-

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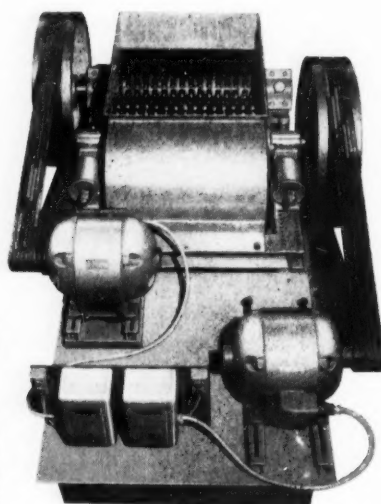
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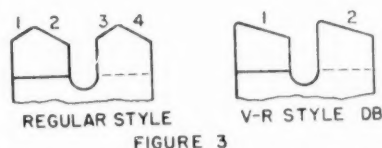
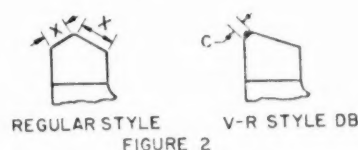
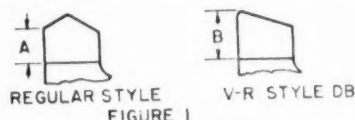
BOX 51

SCOTSDALE, PA.

tact with the work. This small area of the DB tip gives easier, faster feeding. The users who report three times longer life between grinds also report 60% coarser cuttings.



While ordinary style auger bits have four surfaces to grind, the Style DB has only two surfaces (see Fig. 3), reducing wheel costs 50%.



The Style DB auger drill bits are made from the finest grade of Vascoloy-Ramet Tungsten Carbide and are available in sizes from 1-5/8" to 3" in diameter with either standard hexagon or square shanks and are priced the same as regular style auger drill bits.

• Two new mining district offices have been established by Mine Safety Appliances Company, Pittsburgh.

At Uniontown, Pennsylvania, H. R. Johnson, District Manager, has his office at 303 Second National Bank Building—telephone 2500.

Sales engineers stationed at Pittsburgh, Pa., St. Clairsville, Ohio, and Clarksburg and Fairmont, W. Va., report to the new Uniontown district office.

In charge of the new Johnstown, Pa. district office at 610 Johnstown Bank and Trust Company Building, telephone 8-2811, is V. A. Stanton, district manager. Reporting to this office are sales engineers at Ebensburg, Pottsville, Trucksville and Indiana, Pa., and service engineers at Ebensburg, Punxsutawney, Pittston, and Shenandoah.

• RAIN REM, another Speco first in protective coatings, is an entirely new water repellent for use on all types of fabrics. It is a thin, clear, colorless liquid employing a silicone base and a Speco-developed blend of penetrating and protective waterproofings plus a newly-discovered fungicide. Easily applied, RAIN REM dries in a

very short time, to form an invisible coating which repels water. But, unlike many present water-

proofing materials, it permits the free passage of air through fabrics.

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1" Dia.	8c per lineal ft.
1 1/4" Dia.	12c per lineal ft.
1 1/2" Dia.	14c per lineal ft.
1 3/4" Dia.	16c per lineal ft.
1 7/8" Dia.	18c per lineal ft.
2" Dia.	28c per lineal ft.
2 1/2" Dia.	32c per lineal ft.

Special diameters and lengths can be furnished. These Poles meet the requirements of the New Federal Mine Safety Code.

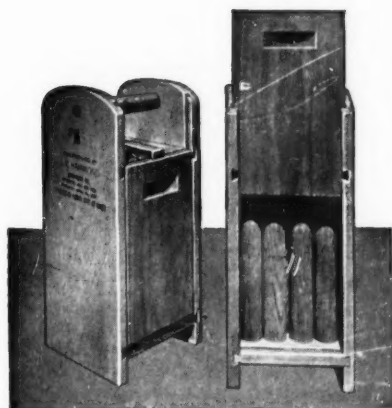


### SECTIONAL TAMPING POLES

These Poles are made of straight grained wood and are coupled together with removable wood pins held in place in recessed grooves by a rubber band and can be quickly connected and unconnected.

Couplers and Head Blocks are 4, 5, and 6 inches in diameter. Please specify size when ordering. Poles are 1 1/2 inches in diameter.

Head Blocks	4" Dia.	\$3.70 Ea.
Couplers	4" Dia.	3.90 Ea.
Poles 12 ft. long	1 1/2" Dia.	3.60 Ea.
Poles 14 ft. long	1 1/2" Dia.	4.20 Ea.
Poles 16 ft. long	1 1/2" Dia.	4.80 Ea.
Poles 18 ft. long	1 1/2" Dia.	6.30 Ea.
Poles 20 ft. long	1 1/2" Dia.	7.00 Ea.
Poles 22 ft. long	1 1/2" Dia.	8.80 Ea.
Poles 24 ft. long	1 1/2" Dia.	9.60 Ea.



**EXPLOSIVE BOXES:** Made entirely of wood having no metal parts, tongue grooved and dovetailed construction with automatic lock using a rubber band for a spring, treated with paraffin to make moisture resistant. "Approved by the Pennsylvania Department of Mines." Sizes as listed based on 1 1/4" x 8" sticks.

### Powder Box Prices are as follows:

No. 9 Powder Box	\$2.55 Ea.	No. 25 Powder Box	\$5.10 Ea.
No. 12 Powder Box	2.95 Ea.	No. 36 Powder Box	6.50 Ea.
No. 16 Powder Box	3.45 Ea.	No. 50 Powder Box	7.40 Ea.
No. 20 Powder Box	3.90 Ea.	No. 72 Powder Box	8.70 Ea.

### Detonator Box Prices are as follows:

No. 6 size 2 1/2" x 3" x 6" inside	\$2.15 Ea.	No. 8 size 2" x 2 1/2" x 8" inside	\$2.15 Ea.
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Made To Withstand High Drilling Speed, Whip And Torsional Strain Of Electric Drills



Drills holes faster — Will not snap off shank or chip points — Outlasts four or five ordinary augers.

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Mine Superintendent with 16 years experience wants to locate new position. Will go anywhere.

Write to:

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Rustrem paints right over rust. For stacks, fire escapes, bridges, fences, flashings, all metal. Farm, auto, marine, machinery. Black and aluminum.



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(2) DIESEL GENERATOR SETS  
(2) 100 KVA, Ac Caterpillar D-17,000 Diesel Electric Sets.  
(1) 100 KVA, DC Buda Diesel Electric set.  
(1) 150 KVA, AC Buda set.  
(1) 25 KVA, AC Cummins Diesel Electric set.  
More Units in stock  
**MEYER BROTHERS**  
Philipsburg, Pa. Phone 701

**STEELTITE COMPOUND** for water spray systems for coal dust control—1 gal. Steel-tite to 1,000 gal. water. Have lower moisture coal—plus clear working conditions around mining machines and cleaning plants.

Hay City Shovel No. 65—1½ yd. Diesel Eng., high front, wide cats. and 1½ yd. Coal Bucket, new in 1948.

GMC 75 Kw Diesel Generator—with automatic control.

11 BU Joy 250-V, DC. Good condition.

Joy 7 SC Cable type shuttle car. A-1 condition. Joy T1 and T2 Cat. Trucks—CP 574 Drills—1948 Model.

Goodman Shortwalls and 512 Trucks. Bargain. Excellent condition.

Joy 8 BU, Myers-Whaley Loaders.

2—Jeffrey 5½ ton Battery Locos—less batteries, permissible type.

1—Brownie HKL Spot Hoist—1948 model.

6—Mine Haulage Hoists—various sizes, complete with motors, starters.

2—G. E. 10 Ton Tandem Locos—42 in. gage, excellent condition. Price open.

800 amp. ITE-KSA Automatic Circuit Breaker—275-V with reverse current relay.

GE 1200 amp 500-V Automatic Circuit Breaker.

100 KW MG set syn. 250-V. Complete panels and switch gear.

Cleaning Plant, 3 years old. 100 tph. 5" x ¾" and ¾" x 0".

WANTED: 2,000 FEET 36" Bely Conveyor.

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NIGHT AND SUNDAY SERVICE

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625 Page Diesel Walking Dragline, 150' boom, 9 yd. bucket, 5 cyl. 12½ x 16 and 3 cyl. 11 x 15 Page diesel engines. Excellent condition — available immediately.

621 Page Single Engine Machine, with 135' boom, 6 yd. bucket, 3 cyl. 12½ x 16 engine. Very good mechanical condition.

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Any Size Any Track Gauge  
**GREENSBURG MACHINE CO.**  
Greensburg Pennsylvania

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Try us for all of your rail needs. We're buying daily — replenishing our stocks in all sizes. Complete stocks of All Track Tools & Accessories.

PIPE ✓ PILING ✓ WIRE ROPE & SLINGS

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Lima Model 1201 Standard Shovel, new in 1948.

International TD 24 Tractor, new in 1952.

Located in coal area of Maryland.

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**COAL MINING**

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### FOR SALE

Several Hundred New 16" Plain Bearing Cast Iron Mine Car Wheels for Reduced End Axles. Bore 2¼" x 1½". Price upon application.

**CLEARFIELD BISUMINOUS  
COAL CORPORATION**  
Indiana, Pa.



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ACTION



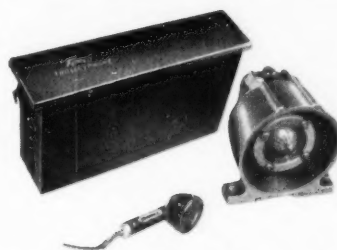
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Specialists in Electronic Communication and Control

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### No. 6

YOUR  
"CATERPILLAR"  
HEADQUARTERS



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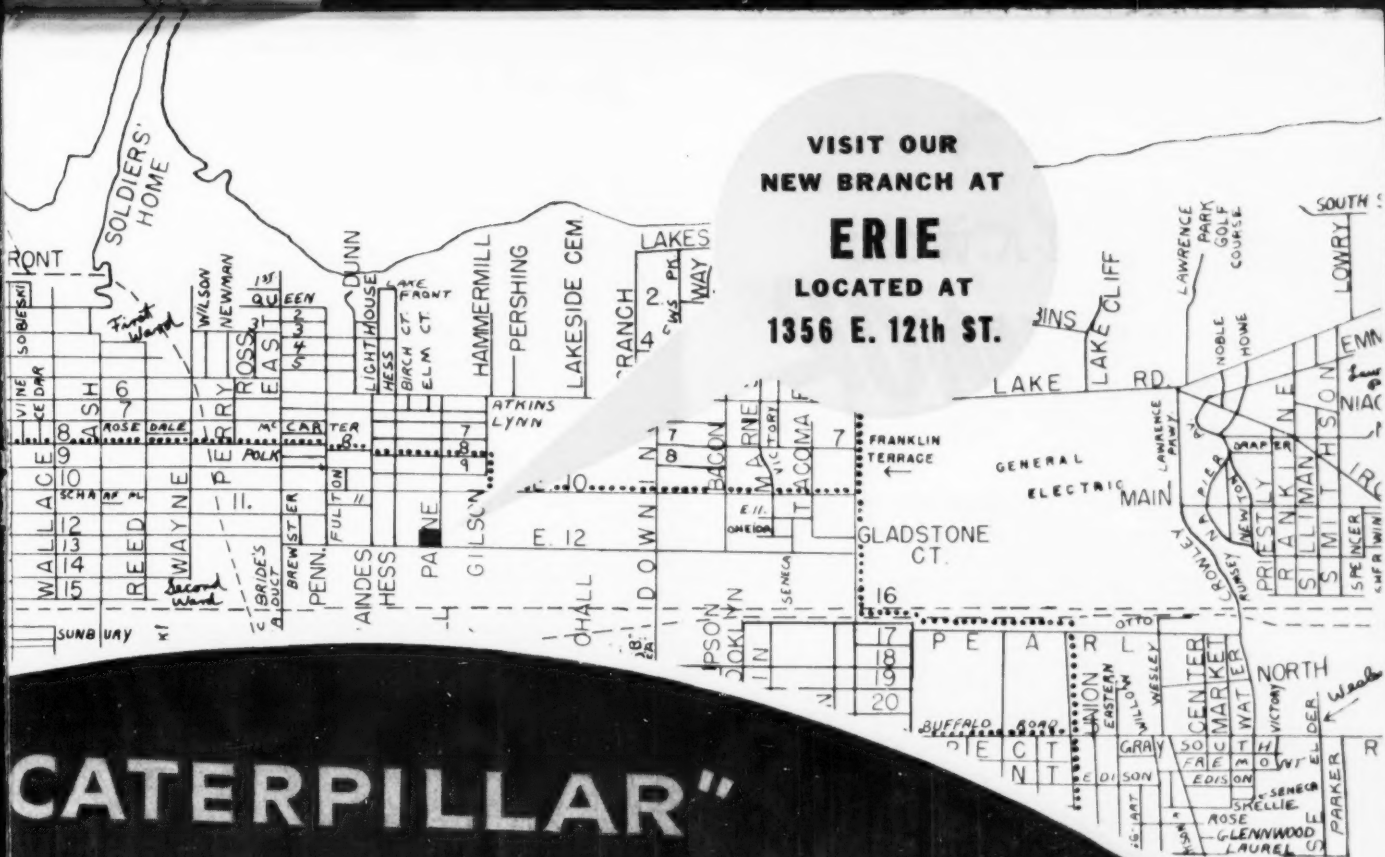
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"CATERPILLAR" DIESEL TRACTORS, ENGINES, MOTOR GRADERS, EARTH-MOVING EQUIPMENT • HYSTER WINCHES AND CRANES • TRAXCAVATOR SHOVELS, TRACKSON PIPE LAYERS • BUCYRUS-ERIE SPUDDERS AND COMPRESSORS AND AIR TOOLS • ATHEY WAGONS, MOBILOADERS, FORCE-FEED LOADERS • MARTIN TRAILERS • BRODERICK AND BASCOM WIRE ROPE • MCKIERNAN TERRY PILE HAMMERS AND EXTRACTORS.

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# "CATERPILLAR" MACHINERY COMPANY



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Erie, Pa. is the home of Beckwith location No. 6 . . . bringing construction men in the surrounding area even better, faster "Caterpillar" service! Now 6 sales-service-parts centers invite you to enjoy these advantages of dealing with Beckwith:

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sell. We'll help you get the maximum production from our products.

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- **MINIMUM DOWN-TIME** . . . with ample parts stocks, we'll reduce your down-time. Your machines will produce more. **YOU'LL PROFIT BY DEALING WITH BECKWITH!**



THE M·S·A·WOLF

**JUNIOR**

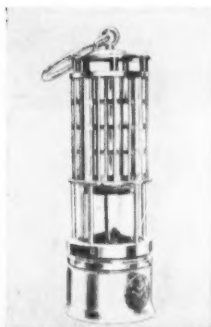
MODEL FLAME SAFETY LAMP

does a

**FULL-SIZE**  
**PERFORMANCE**  
**JOB**

There are good reasons why fire bosses and mine inspectors give their vote of approval to the M.S.A.-Wolf Junior Flame Safety Lamp. They like, first of all, its dependable, steady flame which is guarded from drafts by improved ventilation and specially-designed openings. This feature, combined with the easy-to-read standard size graduated chimney, assures utmost dependability in testing for methane, and oxygen deficiency. Its lighter weight and smaller size are comfort features that make the inspection job easier.

Our bulletin gives complete details on this U. S. Bureau of Mines Approved Safety Lamp. Write for your copy today.



#### M·S·A·WOLF STANDARD MODEL FLAME SAFETY LAMP

Furnished in steel or aluminum, this Standard Model Flame Safety Lamp is dependable in service. The Lamp is equipped with an improved internal igniter. Approved by the U. S. Bureau of Mines, the Standard Model Flame Safety Lamp is available with magnetic lock. Write for complete construction and design details.



- ★ Light weight—cast aluminum construction.
- ★ Standard height graduated glass chimney permits easy reading.
- ★ Made of rust-and-corrosion-proof aluminum for long service life.
- ★ Improved magnetic lock prevents tampering.
- ★ Replaceable wick holder with standard size wick eliminates need to replace complete fount assembly.
- ★ Interchangeability of major parts with standard size Wolf Flame Safety Lamp and ease of assembly means low maintenance.

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SAFETY EQUIPMENT HEADQUARTERS

When you have a safety problem, M.S.A. is at your service.  
Our job is to help you.

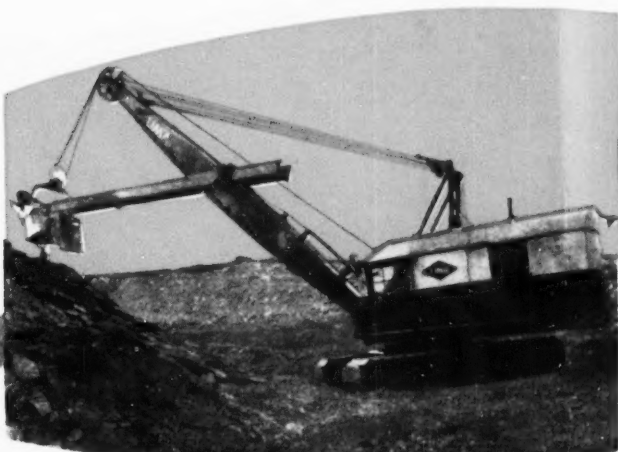
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At Your Service: 69 Branch Offices in the United States & Mexico

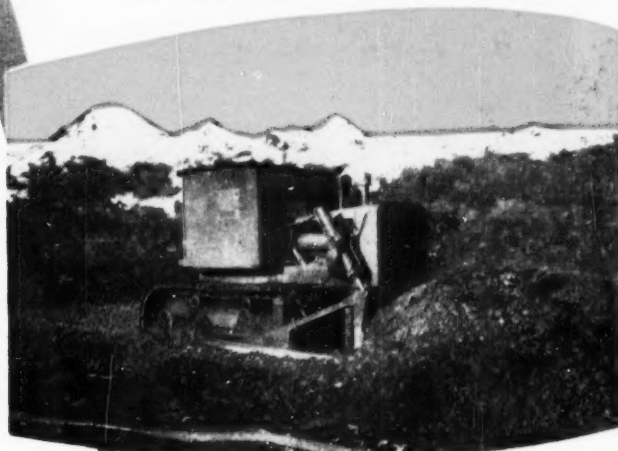
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LIMA 1201 Shovel offers the utmost in dependability and economical operation at HOFFMAN BROS. strip job, near Karthaus.

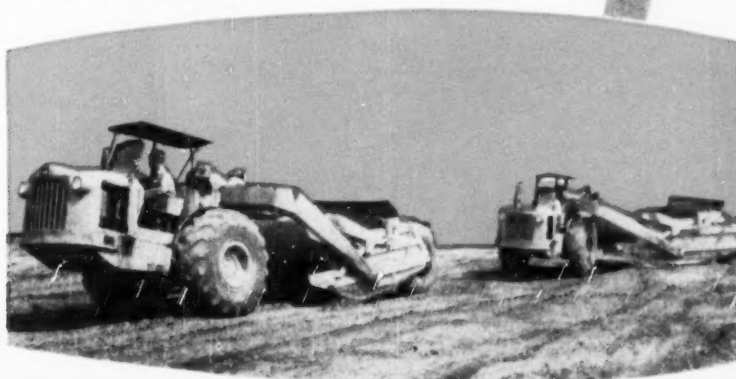


ALLIS-CHALMERS HD-20 is the toughest, strongest tractor ever built. It will take the loads of rush production jobs...stand up under the most grueling operating conditions. Photo shows HD-20, operated by MATHEWS COAL CO., Grampian, Pa.



Let your *Highway* representative show you how to cut stripping costs...

Your Highway equipment engineer will be happy to help you speed up production while reducing equipment investments and operating expense.

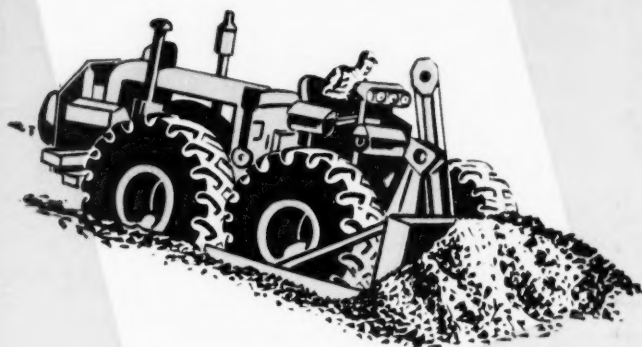


ALLIS-CHALMERS motor scraper at R. C. CARLIN MINE near Snow Shoe.

*Highway*  
EQUIPMENT COMPANY

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Tournatractor, Trademark Angledozer—Trademark Reg. U. S. Pat. Off. D-307-M-b

**Ask for demonstration of Tournatractor at your mine**



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